

CALGON CARBON CORPORATION

GRANULAR ACTIVATED CARBON SYSTEM

N.D.
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FOR

REILLY TAR & CHEMICAL CORPORATION

US EPA RECORDS CENTER REGION 5



514079

GRANULAR ACTIVATED CARBON ADSORPTION SYSTEM

REILLY TAR & CHEMICAL CORPORATION

ST. LOUIS PARK, MINNESOTA

SECTION 1.0 PROJECT DESCRIPTION

1.1 General Description

Calgon Carbon Corporation has been contracted to design and procure a granular activated carbon adsorption system for the treatment of groundwater from St. Louis Park wells No. 10 and No. 15. The granular activated carbon system will remove the polynuclear aromatic hydrocarbons (PAH's) found in the well water and return the purified water to the potable water distribution system.

Calgon's well water treatment system will include two (2) downflow activated carbon adsorbers to be operated in parallel for the removal of PAH's.

The treatment process is explained in Section 1.2 of this description, and the equipment is detailed in Section 1.3. The Design Summary (Section 1.4) and Flow Diagram -- Calgon Drawing No. 9209CG-102 are to be considered part of the operating description.

1.2 Process Description

The granular activated carbon adsorption system will receive water from St. Louis Park wells No. 10 and No. 15 after prefiltration and prior to final chlorination.

The flow will be directed to the activated carbon adsorption system and into 6" influent piping on each vessel. The two adsorbers will be operated in parallel with each vessel receiving up to 600 gpm of water flow. Face piping will be included with the adsorption vessel which will enable series operation if future requirements dictate.

The filtered groundwater enters each vessel through an inlet nozzle at the top. The water is directed downflow through the carbon bed and exits through fifty (50) stainless steel type 100N discharge nozzles. The treated water then is conveyed to a holding vessel for distribution. The need for a booster pump for this conveyance will be determined at a later time.

Each granular activated carbon adsorber is designed to contain 20,000 pounds of Calgon's Filtrasorb 300 Granular Activated Carbon. The location of the effluent septas allows for an empty carbon bed contact time of at least 9 minutes at the maximum flow rate of 600 gpm per vessel. This contact time will allow for removal of the PAH compounds as demonstrated by CH₂M Hill pilot testing.

The activated carbon will require replacement when monitoring of the effluent indicates PAH breakthrough or at a pre-determined bed life. For replacement, each adsorber is shut down by closing influent and effluent water valves. The vessel is pressurized and the carbon discharge valve is opened. The exhausted carbon is conveyed in a slurry form to an empty carbon trailer. Replacement of the carbon bed is achieved through a similar procedure conveying the new carbon from a trailer to the carbon fill line at the top of each vessel. Excess transfer water will leave the vessel via a vent line to the drainage trench.

If cleaning of the granular activated carbon is required, backwashing of the bed is achieved by conveying non-contaminated water (from an uncontaminated well or carbon effluent) through the backwash line upflow through the carbon bed at a rate of 1200 gpm until suitable cleaning of the activated carbon is achieved.

1.3 Equipment Description

The equipment design is summarized in Section 1.4 and shown on reference drawings.

The two (2) adsorbers are each 10 ft. diameter vessels with a 14 ft. straight side and shell heads manufactured to ASME standards for dished heads. The total height of the vessel is 20'1". Each vessel is rated for 125 psig and full vacuum at 150°F, and stamped in accordance with the ASME Code Section VIII.

The vessels are lined with Plasite 4020, an epoxy-phenolic protective coating with abrasion resistance. This Plasite lining meets requirements of and is approved by the U.S. Food and Drug Administration for potable water use.

All piping and valves, as well as the installation and testing of all equipment is in accordance with the applicable Calgon specification as described in Sec. 2.0.

1.4 Design Summary

<u>System Flow Rate</u>	:	1,200 gpm max. 600 gpm per vessel, max.
System Influent Pressure	:	Not to exceed 75 psig
Contaminant Concentration	:	7000 ng/L
Contaminant Removal	:	Total PAH and carcinogenic PAH to levels determined by Reilly Tar & Chemical

Adsorber Design

Quantity	:	2
Diameter	:	10 ft.
Straight Side	:	14 ft.
Shell Head	:	ASME Standard F&D Heads
Overall Height	:	20 ft. 1 in.
Pressure Rating	:	Full Vacuum/125 psig @ 150°F; ASME
Material	:	Carbon Steel A-36
Lining	:	Plasite 4020
Empty Bed Contact Time @ 600 gpm per vessel	:	9 minutes
Carbon Fill	:	20,000 pounds Calgon Filtrisorb 300

System Utility Requirements

Compressed Air	:	100 SCFM @ 80 psig
Potable Water	:	100 GPM @ 40 psig
Electrical Power	:	120 Volts, 30 AMPS, 1 phase, 60Hz
Backwash Water	:	To be determined

Existing Contamination In Well SP#10, SP#15

The PAH contamination level of the groundwater has been listed in Administrative Order Docket No. V-W-84-011 as 7000 ng/l. The individual components comprising this parameter are also listed in this document.

Estimated Annual Carbon Demand

Upon completion of a pilot scale Accelerated Column Test, Calgon will furnish an estimate of the replacement frequency of the granular activated carbon beds necessary to conform to the required treatment criteria.

Project Schedule

Calgon will submit a project schedule upon approval of the contract drawings and receipt of notice to proceed with procurement of the adsorption system components.

Performance Guarantee

Calgon will issue an activated carbon adsorptive performance guarantee pending completion of an Accelerated Column Test piloting of the groundwater treatment. The scope of such guarantee will encompass the expected performance of the initial fill. Any subsequent guarantee will depend upon the requirements of the contract for ongoing granular activated carbon supply.

1.5 Operating Manual

Upon approval of contract drawings, Calgon will prepare complete operating procedures.

In the event Calgon is not awarded contract for system installation, Calgon will issue installation instructions.

1.6 Equipment Warranty

Calgon Carbon Corporation warrants that the equipment sold hereunder shall be free from defects in material and workmanship for a period of one (1) year from the date of shipment. This Warranty does not apply to problems associated with normal wear and tear, improper maintenance, negligence, misuse, or abuse. Calgon Carbon Corporation's sole liability and Buyer's sole remedy under this Warranty is expressly limited to replacement or repair, the choice of remedies to be made exclusively by Calgon Carbon Corporation.

In no event shall Calgon Carbon Corporation be liable for any incidental or consequential damages nor damages in excess of the purchase price of the particular piece of equipment. THERE ARE NO OTHER WARRANTIES MADE WITH REGARD TO THE EQUIPMENT SOLD HEREUNDER OTHER THAN THOSE CONTAINED HEREIN. ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, ARE HEREBY DISCLAIMED INCLUDING, BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

1.7 Calgon's Scope of Work Under This Contract Will Not Include:

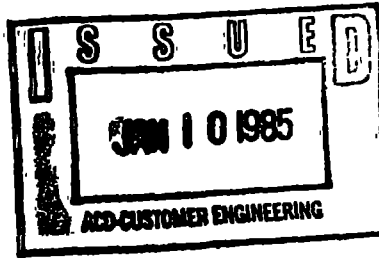
- 1.7.1 Detailed foundation drawings.
- 1.7.2 Building or architectural drawings.
- 1.7.3 Systems or equipment designs outside Calgon's battery limits.
- 1.7.4 Calgon will not supply any equipment, pipe fittings, valves, instruments, pumps, electrical devices, conduit, wire, structural steel and supports, hoses, foundations, and any other material required for installation and start-up of the Activated Carbon Adsorption System, not specifically listed in Sec. 3, Bill of Materials.

SECTION 2.0 SPECIFICATIONS

SUBMITTED FOR APPROVAL

CALGON CORPORATION
PITTSBURGH, PA.

FOR



C.A.S.
STANDARD PLANT

C.A.S. WASTE TREATMENT PLANT

SPECIFICATION NO. 7209A-PS1
FOR
PIPING MATERIALS

April 24, 1973

REVISIONS

This specification has been revised as indicated below and the new pages added and/or the existing pages revised are attached as replacement for those previously issued.

<u>REV.</u>	<u>DATE</u>	<u>BY</u>	<u>PAGE</u>	<u>REMARKS</u>
0	4-26-73	RLB	All	Issued for Purchase
1	5-26-76	ABC	2, 3	Revised and Reissued for Purchase and Construction

**SPECIFICATION FOR
PIPING MATERIALS**

**CALGON CORPORATION
SPEC. NO. 7202A-PS1**

1.0 SCOPE

- 1.1 This specification covers all materials for Piping and Piping Items to be furnished for Calgon Adsorption System installations.

2.0 MATERIALS AND DESIGN

- 2.1 All materials shall conform to this specification and the attached detail specifications comprising the complete piping material specification.
- 2.2 All items shall be standard products of reputable Manufacturers.
- 2.3 All items shall be new, free from defects and imperfections, and shall be of recent manufacture.
- 2.4 Any deviations from this specification shall be clearly stated in writing by the Seller.

3.0 APPLICABLE PUBLICATIONS

- 3.1 The publications of the organizations listed below form a part of this specification to the extent indicated by the references thereto:

3.1.1 American National Standards Institute (ANSI) Standards

Dimensions of pipe, flanges, fittings and piping accessories shall conform to the standards listed. Basic designation of the applicable document forms part of the detail specification for each piping item in the section covering Piping Materials.

3.1.2 American Society for Testing Materials (ASTM) Specifications

Materials for pipe, flanges, fittings and piping accessories shall conform to the specifications listed. Basic designation of the applicable document forms part of the detail specification for each piping item in the sections covering Piping Materials.

4.0 PIPING NOMENCLATURE

- 4.1 Contract Drawings include flow diagrams, detailed piping drawings and spool sheets. The flow diagrams show the piping systems in schematic form and the detailed piping drawings show the actual arrangement and physical layout of the piping systems in each area. Spool sheet drawings show isometric details of piping and give a material list.

4.0 PIPING NOMENCLATURE (Cont'd)

- 4.2 Pipeline designations on the Contract Drawings identify each pipeline. This designation is comprised of four parts as described for the following example:

$1\frac{1}{2}$ RC 15 C1

where the prefix " $1\frac{1}{2}$ " is the nominal size of the pipeline in inches, the symbol "RC" is the line service designation, the number "15" is the individual line number, and the suffix "C1" is the Piping Material Specification, included herein.

Lines are usually numbered consecutively and are inclusive from one definite point, or piece of equipment, to another.

- 4.3 Valves and other piping specialties are identified on the Contract Drawings by the Item No., followed by the size enclosed in a block. For example:

1.01
2"

where 1.01 is the Item No. for a specific valve described in the Piping Material Specification and 2" is the valve size.

5.0 ATTACHMENTS

- 5.1 Detail specifications for pipe, fittings, valves and specialties constitute the attachments to this specification. Inasmuch as the material requirements for each project are different, the actual applicable detail specification will be as designated on the contract drawings and in the bills of materials.

**SPECIFICATION FOR
PIPING MATERIALS**

**FIELD CONSTRUCTION
SPEC. NO.**

Revised 8-9-76

PIPING MATERIAL SPECIFICATION C1

MATERIAL	Carbon steel pipe with iron or steel fittings
RATING	100 PSIG @ 220°F - Water Service 150 PSIG @ 365°F - Steam, Gas and Air Service Includes corrosion allowance of 0.050" minimum
CONSTRUCTION	Screwed for 1½" and smaller Welded and/or flanged for 2" and larger No bending permitted
PIPE	Carbon steel, ASTM A120: Threaded, schedule 80, butt welded, 1½" and smaller Plain end, schedule 40, butt welded or seamless, 2" to 4" Plain end, schedule 40, seamless, 6" to 12" Plain end, 3/8" wall, seamless, 14" to 24"
FITTINGS	300 lb., ANSI B16.3, ASTM A197, malleable iron, banded, threaded ends, 1½" and smaller Schedule 40, ANSI B16.9, ASTM A234, Grade WPA, carbon steel, butt welding ends, 2" to 12" 3/8" wall, ANSI B16.9, ASTM A234, Grade WPA, carbon steel, butt welding ends, 14" to 24"
UNIONS	300 lb., ASTM A197, malleable iron, integral iron seat, ground joint, threaded ends
FLANGES	150 lb., ANSI B16.5, ASTM A181, Grade I, forged carbon steel, slip-on or weld neck type 2" and larger, threaded 1½" and smaller Where bolting to flat face cast iron flanges, steel flanges shall be furnished with a flat face. Others shall be raised face.
ORIFICE FLANGES	Instrument item
BOLTING	Standard square head machine bolts, ASTM A307, Grade B, carbon steel, with one heavy semi-finished hexagon nut per bolt.
GASKETS	Flat ring type for raised face joints, full face for flat face joints. 1/16" thick, dimensions to conform with ANSI B16.21. Compressed asbestos, Johns-Manville No. 60, or equal.

**SPECIFICATION FOR
PIPING MATERIALS**

**CALCON CORPORATION
SPEC. NO.**

Revised 6-21-75
2-23-76
8-9-76
11-26-77
4-3-76

PIPING MATERIAL SPECIFICATION C13

MATERIAL	Galvanized carbon steel pipe with galvanized iron or steel fittings
RATING	100 PSIG @ 220°F - Water Service 125 PSIG @ 350°F - Steam and Air Service Includes corrosion allowance of 0.050" minimum
CONSTRUCTION	Screwed 3" and smaller No bending permitted
PIPE	Galvanized carbon steel, ASTM A120: Threaded, schedule 80, butt welded seam 2" and smaller Threaded, schedule 40, butt welded seam or seamless, 2½" and 3"
FITTINGS	150 lb., ANSI B16.3, ASTM A197, galvanized malleable iron, banded, threaded ends
UNIONS	150 lb., ASTM A197, galvanized malleable iron, integral iron seat, ground joint, threaded ends
FLANGES	150 lb., ANSI B16.5, ASTM A181, Grade I, galvanized forged carbon steel, threaded Where bolting to flat face cast iron flanges, steel flanges shall be furnished with a flat face. Others shall be raised face.
ORIFICE FLANGES	Instrument item
BOLTING	Standard hexagon head machine bolts, ANSI B16.2, ASTM A307, Grade B, carbon steel with one heavy semi-finished hexagon nut and one lock washer per bolt, zinc or cadmium plated.
GASKETS	Flat ring type for raised face joints, full face for flat face joints, 1/16" thick, dimensions to conform with ANSI B16.21. Compressed asbestos, Johns-Manville No. 60, or equal.

**SPECIFICATION FOR
PIPING MATERIALS**

**CAUTION CONNECTION
SPEC. NO.**

Revised 7-10-74
4-21-76
10-11-77
2-27-78

PIPING MATERIAL SPECIFICATION L1

MATERIAL Plastic lined steel pipe with plastic lined flanged fittings.

RATING 150 PSIG @ minus 20° to plus 225°F.

CONSTRUCTION Flanged 1" to 8", Dow chemical Company's MORAF PPL brand piping system using polypropylene resin lined steel pipe and lined cast iron flanged fittings. Each spool piece and fitting to be furnished with ends of plastic liner formed over flanged ends to form a molded raised face.

PIPE Schedule 40, ANSI B36.10, ASTM A53, steel pipe with lining.

FITTINGS 125 lb., ANSI B16.1, ASTM A126, Class A, cast iron flanged with lining.

LINING Thermally stabilized polypropylene resin.

FLANGES 125 lb., ANSI B16.1, ASTM A126, Class A, cast iron, threaded, flat face with smooth finish, drilled and chamfered.

BOLTING Standard hexagon head machine bolts, ANSI B18.2, ASTM A307. Grade B, carbon steel with one heavy semi-finished hexagon nut and one lock washer per bolt, zinc or cadmium plated.

When bolting-up flanges, wrench torques should not exceed the following:

<u>PIPE SIZE</u>	<u>TORQUE</u>	<u>PIPE SIZE</u>	<u>TORQUE</u>
1"	30 Ft. Lbs.	3"	70 Ft. Lbs.
1 1/4"	35 Ft. Lbs.	4"	50 Ft. Lbs.
1 1/2"	40 Ft. Lbs.	6"	60 Ft. Lbs.
2"	45 Ft. Lbs.	8"	100 Ft. Lbs.
2 1/2"	55 Ft. Lbs.		

All torque values measured at 75°F.

GASKETS None required where a molded plastic raised face of a flanged connection mates with the molded plastic raised face of another flanged connection. All other flanged connections to be in accordance with the Project Drawings. For flanged connections requiring a 1/8" thick soft, 50-55 Durometer, flat, ring-type gasket, material to be Goodyear's ethylene propylene rubber (EPR). Dimensions to be in accordance with Dow Chemical Company's Table XX.

FIELD FABRICATION For piping not shop fabricated Contractor must have special tools and equipment to cut the lined pipe and form the molded raised face on the job. See DOW's Form 178-103 "Field Installation of DOW Plastic Lined Piping Products" for necessary equipment and instructions.

Revised 4-18-77

PIPING SPECIALTIES SPECIFICATION 1

GATE VALVES

- 1.01 Bronze Gate Valve, ASTM B-62, solid wedge, integral seats, rising stem, inside screw, union bonnet, threaded ends.
Walworth Fig. 11
Jenkins Fig. 49-U
Crane Fig. 431-UB (2" max. size)

Rating: 150 psig @ 400°F
300 psig WOG @ 150°F

Sizes: 1/4" thru 3"
- 1.02 Bronze Gate Valve, ASTM B-62, solid wedge, integral seats, rising stem, inside screw, union bonnet, threaded ends.
Walworth Fig. 2
Jenkins Fig. 47-U
Crane Fig. 428-UB (2" max. size)

Rating: 125 psig @ 400°F
200 psig WOG @ 150°F

Sizes: 1/4" thru 3"
- 1.03 Cast Iron Gate Valve, ASTM A-126, Grade B, bronze mounted, solid wedge, renewable seats, rising stem, outside screw and yoke, 125 lb. ANSI B16.1 flanged ends.
Walworth Fig. 726-F
Jenkins Fig. 651-A
Crane Fig. 465½ (8" max. size)

Rating: 125 psig @ 450°F
200 psig WOG @ 150°F - 2" to 12"

Sizes: 2" thru 30"
- 1.04 Bronze Gate Valve, ASTM B-61, solid wedge, renewable seats, rising stem, inside screw, union or bolted bonnet, threaded ends.
Walworth Fig. 36
Jenkins Fig. 270-U (2" max. size)
Crane Fig. 424

Rating: 200 psig @ 550°F
400 psig WOG @ 150°F

Sizes: 1/4" thru 3"

Revised 1-15-75
4-20-77

GLOBE VALVES (Cont'd)

- 2.09 Steel Barstock Globe Valve, integral seat, plug type disc, rising stem, inside screw, screwed bonnet and packing gland nut, malleable iron handwheel or tee handle, female threaded ends.

Crane 222H
Powell Fig. 675

Rating: 3000 psig WOG @ 100°F

Sizes: 1/8" thru 1"

- 2.10 Type 316 Stainless Steel Barstock Globe Valve, integral seat, plug type disc, rising stem, inside screw, screwed bonnet and packing gland nut, malleable iron handwheel or tee handle, female threaded ends.

Crane Fig. 222SS
Powell Fig. 1976

Rating: 3000 psig WOG @ 100°F

Sizes: 1/8" thru 1"

- 2.11 Bronze Globe Valve, ASTM B-61, regrind-renew nickel bronze seat and disc, rising stem, inside screw, union bonnet, socket ends for solder joints.

Powell Fig. 1872A

Rating: 200 psig @ 388°F
400 psig WOG @ 150°F

Sizes: 1/4" thru 2"

- 2.12 Bronze Globe Valve, ASTM B-62, integral seat, renewable asbestos composition disc, rising stem, inside screw, union or bolted bonnet, threaded ends.

Walworth Fig. 95
Crane Fig. 7
Powell Fig. 150A

Rating: 150 psig @ 300°F
300 psig WOG @ 150°F

Sizes: 1/8" thru 3"

Added 5-19-75

Revised 6-1-77
12-19-77

BUTTERFLY VALVES (Cont'd)

- 3.09** Ductile iron, two-piece lug-type body, TFE lined butterfly valve, TFE encapsulated iron disc and stainless steel shaft, TFE coated bearings, TFE shaft seal and seat, metal notched throttling handle for 2" thru 4" sizes, and handwheel operator for 6" and larger. Lug holes to conform to 150 lb. ANSI flange drilling. Garlock Gar-Seal 100 Series, or equal.

Rating: 150 psig @ -40°F to 400°F

Sizes: 2" thru 24"

- 3.10** Cast iron, two-piece wafer type body, TFE lined butterfly valve, TFE encapsulated 316 stainless steel disc and stem, resilient TFE lined seat, Acetal stem bushing, Buna-N stem packing, 316 stainless steel body screws, metal notched throttling handle for 2" thru 4" sizes, and handwheel operator for 6" and larger. All sizes to be suitable for mounting between 125 lb. or 150 lb. ANSI flanges.

Keystone Figure 999, or equal.

Rating: 150 psig @ 0°F to 250°F for 2" to 12" sizes
75 psig @ 0°F to 250°F for 14" and 16" sizes

Sizes: 2" thru 16"

- 3.11** Cast iron, one piece wafer type body, Buna-N seat and flange gasket, aluminum bronze disc, 18-8 stainless steel one piece thru shaft, self-locking Type 316 stainless steel disc screws, Buna-N shaft seal and reinforced Teflon upper and lower inboard bushings. Wafer body to mate with 125 lb. or 150 lb. ANSI flanges. Notched plate handle for throttling valve in 10 position increments to be furnished for valve sizes 2" thru 10". Weatherproof worm gear wheel operator for sizes 12" thru 20". Valves to meet or exceed all of the design strength, testing and performance requirements of A.W.W.A. Specification C-504-70.

Keystone Valve Figure 239, or equal.

Rating: 200 psig in closed position @ 212°F

Sizes: 2" thru 20"

SPECIFICATION FOR
PIPING MATERIALS

CALSON CORPORATION
SPEC. NO.

Revised 2-7-75

7-6-76

2-2-76

BALL VALVES (Cont'd)

- 4.04 Carbon steel body regular port ball valve, blow-out proof stem, ball and seat retainer design to permit valve to be dead ended in either flow direction, hard chrome plated carbon steel ball and stem, TFE seats and seals (furnish glass fiber reinforced TFE if required to meet pressure and temperature rating), wrench handle operated, threaded ends.

Rating: 600 psig @ 100°F
150 psig @ 366°F

Sizes: 1/4" thru 2"

Models: Consolidated Valve Industries "APOLLO" 73 Series, or equal
Jamesbury "CLENCHER" Code No. 21-22224T-0, or equal
Clayton Mark-Pacific Valve Figure No. CS-880-T-T, or equal
Worcester "WCVCO" 600, Figure No. 5844R, or equal

**SPECIFICATION FOR
PIPING MATERIALS**

**CALSON CORPORATION
SPEC. NO.**

Revised 9-25-75
- 3- 1-76

PLUG VALVES (Cont'd)

- 6.09 Multi-port plug valve, cast iron with polypropylene lining, Teflon bearing rings and V-type fluorocarbon packing, 125 lb. ANSI B16.1 flanged ends, 3 way/3 port, 90° rotation, tee port type with 2 position setting, wrench operated and complete with wrench. Port to port connections for each position of wrench handle to be specified on the Project Bill of Material.
- Dow Chemical Co. Figure 276, or equal.
- Rating: 125 psig at minus 200° to 250°F
- Sizes: 2" thru 4"
- 6.10 Multi-port plug valve, semi-steel body, neoprene faced transfer style plug, Buna packing, 125 lb. ANSI B16.1 flanged ends, 4 way/4 port, 90° rotation, 2 position setting, lever operated and complete with lever. Port to port connections for each position of wrench handle to be specified on the Project Bill of Material.
- DeZurik Figure 204, or equal.
- Rating: 125 psig at 180° F
- Sizes: 3" thru 12"
- 6.11 Multi-port plug valve, cast iron with polypropylene lining, Teflon bearing rings and V-type fluorocarbon packing, 125 lb. ANSI B16.1 flanged ends, 4 way/4 port, 90° rotation, 2 position setting, wrench operated and complete with wrench. Port to port connections for each position of wrench handle to be specified on the Project Bill of Material.
- Dow Chemical Co. Figure 277, or equal.
- Rating: 125 psig at minus 20° to 250°F
- Sizes: 1" thru 3"
- 6.12 Plug valve, cast iron with polypropylene lining, Teflon bearing rings and V-type fluorocarbon packing, 125 lb. ANSI B16.1 flanged ends, 90° rotation, 2 position setting, wrench operated and complete with wrench. Gear operated for 4" and 6" sizes. Port to port connections for each position of wrench handle to be specified on the Project Bill of Material.
- Dow Chemical Co. Figure 250, or equal.
- Rating: 125 psig at minus 20° to 250°F
- Sizes: 1" thru 6"

PIPING SPECIALTIES SPECIFICATION: 8

CHECK VALVES

8.01 Check valve, horizontal or vertical swing type. ASTM A-126, Class B cast iron body, all iron mounted, regrinding steel disc, screw-in cap, threaded ends. Jenkins Fig. 72, or equal.

Rating: 250 psig WOG @ 100°F

Sizes: 1/2" thru 2"

8.02 Check valve, horizontal or vertical swing type. ASTM A-126, Class B cast iron body, bronze mounted, regrindable - renewable disc and seat ring, bolted cover, 125 lb. ANSI B16.1 flanged ends. Jenkins Fig. 624, or equal.

Rating: 125 psig saturated steam
200 psig WOG @ 100°F

Sizes: 2" thru 12"

8.03 Check valve, horizontal or vertical swing type. ASTM A-126, Class B cast iron body, all iron mounted, regrindable - renewable disc and seat ring, bolted cover, 125 lb. ANSI B16.1 flanged ends. Jenkins Fig. 85, or equal.

Rating: 200 psig WOG @ 100°F

Sizes: 2" thru 12"

8.04 Check valve, horizontal or vertical swing type, cast steel body, ASTM A-216, Grade WCB, trim ASTM A-182, Grade F6 (type 410 chromium steel), flanged ends. Crane figure 159X, or equal.

Rating: 300 psig per ANSI B16.5

Sizes: 2" thru 10".

CHECK VALVES (Cont'd)

- 6.31 Check valve, horizontal or vertical swing type. Forged carbon steel body and bonnet, alloy steel trim, bolted and gasketed bonnet, hard faced renewable seat, threaded ends. Vogt Series No. S-701, or equal.

Rating: 800 psig @ 850°F

Sizes: 1/2" thru 2"

- 6.32 Check valve, horizontal or vertical swing type. Forged carbon steel body and bonnet, alloy steel trim, bolted and gasketed bonnet, hard faced renewable seat, socket weld ends. Vogt Series SWS-701, or equal.

Rating: 600 psig @ 900°F
2000 psig @ 100°F

Sizes: 1/2" thru 2"

- 8.33 Check valve, horizontal or vertical swing type. ASTM A-216, Grade B cast steel body and cover, alloy steel trim, bolted and gasketed cover, 150 lb. ANSI B16.5 flanged ends. Walworth Fig. 5341F, or equal.

Rating: 150 pound ANSI B16.5

Sizes: 2" thru 24"

- E.51 Check valve, horizontal or vertical swing type. ASTM A-296, Grade CF-8 cast stainless steel (wrought type 304) body, cover and all wetted parts, bolted and gasketed cover, threaded ends. Walworth Fig. 370, or equal.

Rating: 150 pound ANSI B16.5

Sizes: 1/2" thru 2"

**SPECIFICATIONS FOR
PIPING MATERIALS**

**CALGON CORPORATION
SPEC. NO.**

Revised 11-23-76

Revised 6-22-79

SIGHT FLOW INDICATORS (Cont'd)

- 23.28 Sight Flow Indicator, full view type, no internal indicator. For horizontal flow, vertical up-flow or vertical down-flow mounting. Heavy duty Pyrex inner cylinder with a heavy duty Plexiglas protective outer cylinder, Viton seals, polypropylene female NPT end fittings with cadmium plated studs and nuts.

Corr Tech, Inc. PLAST-O-MATIC Series "G", or equal.

Rating: 150 psig @ 75°F

<u>SIZE</u>	<u>VISUAL LENGTH</u>	<u>PART NUMBER</u>
1/2"	2-1/4"	GY050V
3/4"	2-1/4"	GY075V
1"	2-1/4"	GY100V
1-1/4"	2-1/2"	GY125V
1-1/2"	2-1/2"	GY150V
2"	3-1/8"	GY200V
3"	3-3/8"	GY300V

- 23.29 Sight Flow Indicator, full view wafer type, no internal indicator. For horizontal flow, vertical up-flow or vertical down-flow mounting. Heavy duty Pyrex inner cylinder with a heavy duty Plexiglas protective outer cylinder, Viton "O" rings and polypropylene end pieces.

Construction to be in accordance with PLAST-O-MATIC VALVES, INC. Drawing 942A.

Rating: 150 psig @ 75°F

Mounting: For insertion between Std. 150# ANSI F.F. flanges

Sight Length: Approx. 3 1/2"

Sizes: 3" & 4"

**SPECIFICATION FOR
PIPING MATERIALS**

**CALSON CORPORATION
SPEC. NO.**

Revised 4-6-76
7-27-76

SPRAY NOZZLES (Cont'd)

- 25.21 Spray Nozzle, polypropylene construction, flood jet nozzle, wide deflector type flat spray pattern, male pipe thread connection.**

Spraying Systems Co., or equal.

Rating: 150 psig at 100°F

Size and	1/8"	1/8KPP2.5
Nozzle No:	1/4"	1/4KPP5
	1/2"	1/2KPP40
	3/4"	3/4KPP90
	1"	1KPP300

Capacities: See Mfr's catalog for flows at various pressures.

- 25.22 Spray Nozzle, polypropylene construction, stubby type, full cone narrow angle (60°) spray pattern, male pipe thread connection.**

Bete Fog Nozzle, Inc. NCS Series, or equal.

Rating: 150 psig at 100°F

Size and	1"	NCS1007N
Nozzle No:	1½"	NCS1516N
	2"	NCS2035N
	2½"	NCS2550N

Capacities: See Mfr's catalog for flows at various pressures.

- 25.23 Spray Nozzle, polypropylene construction, full cone narrow angle (30°) spray pattern, female pipe thread connection.**

Bete Fog Nozzle, Inc. NCK Series, or equal.

Rating: 150 psig at 100°F

Size and	3/4"	NCF0706K-30
Nozzle No:	1"	NCF1012K-30
	1½"	NCF1526K-30
	2"	NCF2048K-30
	2½"	NCF2572K-30

Capacities: See Mfr's catalog for flows at various pressures.

**SPECIFICATION FOR
PIPING MATERIALS**

**CALGON CORPORATION
SPEC. NO.**

Added: 2-12-76

Revised: 10-3-77

HOSE (Cont'd)

- 31.51** Radial Flex Heavy Duty Carbon Slurry Hose with abrasion resistant green flexible PVC outer cover, rigid white overlapping F7C spiral reinforcement, and smooth green PVC inner lining. Hose size and length to be as indicated on the drawings or in the bill of material. End fittings to be combination hose shank and quick-disconnect coupler, Item No. 32.37.

B.F. Goodrich Radial Flex, or equal.

Rating: 125 to 50 psig at 70°F depending on size
65 to 20 psig at 150°F depending on size

Sizes: 1½" thru 6"

- 31.52** General Purpose Air and Water Hose with abrasion and weather resistant Green Ozex outer cover, high-tensile braided rayon fiber carcass, and Paracril oil resistant rubber inner tube. Hose size and length to be as indicated on the drawings or in the bill of material. End fittings to be combination hose shank and quick-disconnect coupler, Item No. 32.37.

Uniroyal P-290, or equal.

Rating: 225 psig at ambient temperatures

Sizes: 1/2" thru 1½"

- 31.53** Flexible Steam Hose with abrasion resistant red EPDM rubber outer cover, high-tensile carbon steel wire braided carcass, and red EPDM rubber inner tube. Hose size and length to be as indicated on the drawings or in the bill of material. End fittings to be Dixon Valve & Coupling Co.'s "GJ-BOSS" Style X-34 brass swivel nut coupling with ground joint seal, 3/4" female NPT brass spud and "BOSS" cadmium plated malleable iron standard hose clamp. One end to be furnished with 3/4" x 1/2" NPT swaged nipple for connection to Steam Gun, Item No. 32.27.

Uniroyal P-409, or equal.

Rating: 250 psig @ 407°F

Sizes: 1/2" thru 1½"

NOTE: The above three items shall be used for all hose requirements for CAS facilities unless otherwise directed by the Calgon Engineer.

**SPECIFICATION FOR
PIPING MATERIALS**

**CALGON CORPORATION
SPEC. NO.**

Added: 12-28-77

Added: 5-2-79

HOSE (Cont'd)

- 31.54 Carbon Slurry Hose, Vol-U-Flex, with red abrasion and weather resistant flexible Nitrile/PVC outer cover, spun polyester fabric steel wire helix reinforced carcass, and smooth nitrile inner lining. Hose size and length to be as indicated on the drawings or in the bill of material. End fittings to be combination hose shank and quick-disconnect coupler, Item No. 32.37.

Salem-Republic Rubber Co., Vol-U-Flex P25-30B-01 (H525), or equal.

Rating: 75 to 45 psig at ambient temperature depending on size

Sizes: 2" thru 4"

- 31.55 Carbon Slurry Hose, Vol-U-Flex, with red abrasion and weather resistant flexible Nitrile/PVC outer cover, spun polyester fabric steel wire helix reinforced carcass, and smooth nitrile inner lining. Hose size and length to be as indicated on the drawings or in the bill of material. End fittings to be combination hose shank and quick-disconnect coupler, Item No. 32.37, on one end and combination hose shank and quick-disconnect adaptor, Item 32.38, on the other end.

Salem-Republic Rubber Co., Vol-U-Flex P25-30B-01 (H525), or equal.

Rating: 75 to 45 psig at ambient temperature depending on size

Sizes: 2" thru 4"

- 31.56 Carbon Slurry Hose, Vol-U-Flex, with red abrasion and weather resistant flexible Nitrile/PVC outer cover, spun polyester fabric steel wire helix reinforced carcass, and smooth nitrile inner lining. Hose size and length to be as indicated on the drawings or in the bill of material. End fittings to be combination hose shank and quick-disconnect coupler, Item No. 32.38

Salem-Republic Rubber Co., Vol-U-Flex P25-30B-01 (H525), or equal.

Rating: 75 to 45 psig at ambient temperature depending on size

Sizes: 2" thru 4"

**SPECIFICATION FOR
PIPING MATERIALS**

**CALGATI CORPORATION
SPEC. NO.**

Revised 5-22-73
7-17-75
2-16-76

PIPING SPECIALTIES SPECIFICATION 30

MISCELLANEOUS PIPING ITEMS

30.02 Compressed air, water and oil filter with cast iron head and "T" handle cover nut, steel shell, filter tube, threaded line connections, petcock drain and mounting bracket.

Filterite Corporation Series AMO, or equal.

Rating: 125 psig @ 100°F

Sizes: For instrument air use "Micro-Carbon-A" filter tube

<u>Model No.</u>	<u>Line Connections</u>	<u>Filter Tube Model No.</u>	<u>Length</u>	<u>Capacity*</u>
AM04-3/8B	3/8" Female NPT	C4P-A	4"	20 SCFM
AM08-3/4B	3/4" Female NPT	C8P-A	8"	40 SCFM
AM010-3/4B	3/4" Female NPT	C10P-A	10"	50 SCFM
AM010-1B	1" Female NPT	C10P-A	10"	50 SCFM

For plant air use "Diamond" filter tube

<u>Model No.</u>	<u>Line Connections</u>	<u>Filter Tube Model No.</u>	<u>Length</u>	<u>Capacity*</u>
AM04-3/8B	3/8" Female NPT	GC4	4"	40 SCFM
AM06-1/2B	1/2" Female NPT	GC6	6"	60 SCFM
AM08-3/4B	3/4" Female NPT	GC8	8"	80 SCFM
AM010-3/4B	3/4" Female NPT	GC10	10"	100 SCFM
AM010-1B	1" Female NPT	GC10	10"	100 SCFM

*** Flow rate based on operating pressure of 50 psig with an initial pressure drop of 3 psig.**

**SPECIFICATION FOR
PIPING MATERIALS**

**CALGON CORPORATION
SPEC. NO.**

Added 1-14-76

Revised 2-16-76

6-14-76

HOSE FITTINGS (Cont'd)

- 32.27 Steam Gun Assembly, nozzle control type with swivel handle. Gun to be manufacturer's standard steel pipe construction complete with nozzle, swivel joints, handle assemblies, and manual control valve. Gun to have female threaded inlet fitting and shall be approximately 45 inches long overall. Finish to be manufacturer's standard.
- Jenny Division of Homestead Industries, Model No. JE-259, or equal.
- Rating: 40 to 200 psig steam
- Size: 1/2"
- 32.28 Quick Disconnect Coupling. Coupling to be a half coupling type with wing nut, snap ring and Buna-N seal. Coupling to be brass with malleable iron wing nut and shall have a female NPT inlet.
- Aeroquip Corp., Part No. 5100-S5, or equal.
- Rating: 125 psig at 250°F
- Sizes: 1/4" thru 1 1/2"
- 32.29 Quick Disconnect Coupling. Coupling to be a half coupling type without flange. Coupling to be brass and shall have a female NPT inlet.
- Aeroquip Corp., Part No. 5100-S2, or equal.
- Rating: 125 psig at 250°F
- Sizes: 1/4" thru 1 1/2"

**SPECIFICATION FOR
PIPING MATERIALS**

**CALGON CORPORATION
SPEC. NO.**

Added 2-16-76

HOSE FITTINGS (Cont'd)

- 32.31 Quick Disconnect Adaptor, 304 stainless steel, female NPT on one end with other end for connecting to quick disconnect coupler.
OPW Division of Dover Corp., Kamlok Part No. 633-A, or equal.
Rating: 75 psig to 250 psig @ 225°F depending on size
Sizes: 1/2" thru 4"
- 32.32 Quick Disconnect Adaptor, 304 stainless steel, male NPT on one end with other end for connecting to quick disconnect coupler.
OPW Division of Dover Corp., Kamlok Part No. 633-F, or equal.
Rating: 75 psig to 250 psig @ 225°F depending on size
Sizes: 1/2" thru 4"
- 32.33 Quick Disconnect Adaptor, 150 lb. ANSI flange, 304 stainless steel construction.
OPW Division of Dover Corp., Kamlok 633-LAS, or equal.
Rating: 150 psig @ 225°F
Sizes: 1" thru 4"
- 32.34 Quick Disconnect Coupler, 304 stainless steel, Buna-N gaskets, male NPT on one end with other end for connecting to quick disconnect adaptor.
OPW Division of Dover Corp., Kamlok Part No. 633-B, or equal.
Rating: 75 psig to 250 psig @ 225°F depending on size
Sizes: 1/2" thru 4"
- 32.35 Quick Disconnect Coupler, 304 stainless steel, Buna-N gaskets, female NPT on one end, other end for connecting to quick disconnect adaptor.
OPW Division of Dover Corp., Kamlok Part No. 633-D, or equal.
Rating: 75 psig to 250 psig @ 225°F depending on size
Sizes: 1/2" thru 4"
- 32.36 Dust Plug for couplers, 304 stainless steel, complete with 15" length of brass or stainless steel chain.
OPW Division of Dover Corp., Kamlok Part No. 634-A, or equal.
Rating: 75 psig to 250 psig @ 225°F depending on size
Sizes: 1/2" thru 4"

PIPING SPECIALTIES SPECIFICATION 35
PLASTIC SPACERS FOR POLYPROPYLENE LINED PIPE

The spacers listed below for plastic lined pipe shall be fabricated from thermally stabilized polypropylene resin suitable for minus 20° to plus 225° F. service. Spacers shall be molded or machined in accordance with Calgon Drawing No. 7209A-561.

Sizes: 1" through 8", unless otherwise stated.

- 35.01 Standard ring spacer
- 35.07 Standard ring blind spacer
- 35.13 Standard full face spacer
- 35.19 Standard full face blind spacer
- 35.25 Special tapered bore ring spacer
- 35.31 Single taper ring spacer with 4° - 9° taper - for 4" line only.
- 35.37
- 35.43 Orifice spacer, ring type/one 3/4" FNPT tap
- 35.49 Orifice spacer, ring type/one 1/2" FNPT tap
- 35.55 Orifice spacer, ring type/two 3/4" FNPT taps @ 180°
- 35.61 Orifice spacer, ring type/two 3/4" FNPT taps @ 90°
- 35.67 Orifice spacer, ring type/one 1/2" and one 3/4" FNPT tap @ 180°
- 35.73 Orifice spacer, ring type/one 1/2" and one 3/4" FNPT tap @ 90°
- 35.79 Orifice spacer, ring type/one 1 1/2" FNPT tap.
- 35.85 Orifice spacer, ring type/one 3/4" and one 1 1/2" FNPT tap @ 180°

- 35.98 Special Flush/Drain Screen Spacer/one 3/4" and one 1" FNPT tap - for 4" size line only.
- 35.99 Special Flush/Drain Screen Spacer/one 1 1/2" and one 2" FNPT tap - for 4" size line only.

CALGON ADSORPTION SYSTEMS
STANDARD PLANT
REVISION "2" 4-29-77

RUPTURE DISKS
SPEC. NO. 7209A-CS172
PAGE 1 of 1

RUPTURE DISKS

MANUFACTURER: Process Equipment Division - Carborundum Co.

RUPTURE DISK

Type: Standard
Size: (See below)
Material: Impervious graphite
Vacuum Support: Furnish for disks with bursting pressure of 15 psig or less

DISK HOLDER: Rupture disk to fit between 150# ANSI RF or FF companion flanges furnished by others.

SERVICE CONDITIONS

Fluid Under Disk: Waste water
Pressure Fluctuation: Steady during normal operation
Temperature: 40°-150°F
Operating Pressure: 65 psig max.
Back Pressure: Atmospheric
Vessel Design Pressure: 75 psig @ 100°F

PERFORMANCE REQUIREMENTS

Bursting Pressure: 75 psig \pm 5%
Coincident Temp: 40° to 150°F
Relieving Capacity Req'd: Nil - for thermal expansion

TAGGING: Tag with Item No. and Service

<u>ITEM NO.</u>	<u>SIZE</u>	<u>BURSTING PRESSURE</u>
PSE-155	1"	75 psig \pm 5%
PSE-156	1½"	75 psig \pm 5%
PSE-157	2"	75 psig \pm 5%
PSE-252	3"	75 psig \pm 5%

A.S.M.E. Nameplate: Furnish in accordance with code requirements.

ALTERNATE SOURCES:

MANUFACTURER

MODEL NO.

Zook
Carlone
Frangible Disks

PRESSURE INDICATING GAGES

MODEL: Weksler AA44P-Liquid Fill

GAGE

Case: 1/2" size, stainless steel, steel, brass, aluminum
and phenol
Socket: 1/2" NPT male bottom connection, stainless steel
Dial: White litho with black figures
Pointer: Balanced micrometer
Bourdon Tube: Stainless steel
Movement: Stainless steel and Delrin
Accuracy: 1% of full range
Range: Listed below
Liquid Fill: Glycerin (Temp. range of -36°F to + 140°F)

TAGGING: Tag each assembly with Item No. and Service

ITEM NO.

SERVICE

PI-213	0-15 psig
PI-214	0-30 psig
PI-215	0-60 psig
PI-216	0-100 psig
PI-217	0-160 psig
PI-218	0-200 psig

NOTE:	Replaces Items	PI-101	Spec. 7209A-CS161
		PI-102	" " "
		PI-103	" " "
		PI-104	" " "
		PI-105	" " "
		PI-106	" " "
		PI-107	Spec. 7209A-CS162
		PI-108	" " "
		PI-109	" " "
		PI-110	" " "
		PI-111	" " "
		PI-112	" " "

CALGON ADSORPTION SYSTEM
CHANUTE A.F.B.
REVISION "0" 8-20-79

DIFFERENTIAL PRESSURE SWITCH
SPEC. NO. 8209S-CS541
PAGE 1 OF 1

ITEM NO: PDS-571

NO. REQUIRED: 4

TYPE: Differential Pressure Switch

MANUFACTURER: Static "O" Ring Inc.

MODEL: 15R3-K5

CASE:
Type: Weathertight Housing
Pressure Connection: 1/4" FNPT
Electrical Connection: 3/4" FNPT

MEASURING ELEMENT:
Type: Diaphragm
Differential Pressure
Operating Range: 3 - 50 psi (adjustable)
Working Pressure Range: 50 psig

SWITCH:
Type: 1 SPDT
Rating: 15 amps @ 480 Volts A.C.
Set Point: 35 psi differential pressure
Adjustment: Internal over full range

TAGGING: Tag with Item No. and Spec. No.

CALGON ADSORPTION SYSTEMS
STANDARD PLANT
REVISION "1" 4-29-77

TEMPERATURE INDICATORS
SPEC. NO. 7209A-CS184
PAGE 1 of 1

TEMPERATURE INDICATOR

MANUFACTURER & MODEL: Ashcroft Model AHT, or equal

TYPE: Bi-Metal dial thermometer and thermowell with lagging extension

FORM: Back connected

HEAD
Size: 5" diameter
Material: Type 304 stainless steel case and bezel

RANGE: See below

DIAL: Laminated plastic with white face and black markings

STEM
Material: Type 304 stainless steel
Connection: 1/2" NPT
Diameter: 1/4 inch
Length: 6 inch ("S")

THERMOWELL
Construction: Solid bored
Material: Carpenter 20 stainless steel, ASTM B473
Equipment Connection: 3/4" NPT
Dimensions
Length under Thread: 2 1/2" ("U")
Overall Length: 6 1/4" ("L")
Lagging Extension: 2" ("T")

TAGGING: Tag all items with Item No.

ITEM NO. RANGE

TI-139 0-200°F

ALTERNATE SOURCES:	MANUFACTURER	MODEL NO.
	Weston	
	Weksler	
	Marsh	

CALGON CORPORATION
PITTSBURGH, PA

FOR

CCS
STANDARD PLANT

CCS TREATMENT PLANTS

SPECIFICATION NO. 7209A-RS7
FOR
SHOP PRIMING WORK
(EPOXY)

February 20, 1975

REVISIONS

This specification has been revised as indicated below and the new pages added and/or the existing pages revised are attached as replacement for those previously issued.

<u>REV.</u>	<u>DATE</u>	<u>BY</u>	<u>PAGE</u>	<u>REMARKS</u>
0	2-21-75	ABC	All	Issued for Construction
1	4-3-75	ABC	2	Revised Scope of Work and Reissued for Construction
2	5-8-75	ABC	2	Clarified Scope of Work, added notes and Reissued for Construction
3	5-23-75	ABC	All	General Revision and Reissue for Construction
4	6-25-75	ABC	2	Deleted Paragraph 2.4 regarding third coat and changed 2.5 to 2.4. Reissued for Construction.
5	12-13-79	WAB	1	Title Update

RS7.1-3

1.0 SCOPE OF WORK

- 1.1 The work to be performed under this specification consists of shop coating all unpainted external surfaces of carbon steel vessels including support legs, baseplates and skids.

2.0 MATERIALS

- 2.1 Unless otherwise specified, paints shall be those manufactured by PPG Industries, Inc., One Gateway Center, Pittsburgh, Pa. 15222. Paint product numbers given herein are shown in PPG's Bulletin 396 covering zinc rich heavy duty coatings, Paint System No. 7.
- 2.2 First coat shall be Aquapon primer, a zinc rich coating material, Priduct Code No. UC-46079, red.
- 2.3 Second coat shall be Aquapon intermediate, a zinc rich high build coating material, Product Code No. UC-46545, gray.
- 2.4 Type and quantity of thinner shall be in accordance with the manufacturer's recommendations.

3.0 PERFORMANCE

- 3.1 All painting work shall be performed in accordance with the best practices in use at the time of the work.
- 3.2 The work covered by this specification includes prime and intermediate coatings.
- 3.3 Surfaces of the following materials shall not be painted: aluminum, brass, bronze, copper, galvanized iron, stainless steel, chrome plated and/or polished metals, and plastics.
- 3.4 All surfaces which are not to be painted including the inside of the vessels and vessel nozzles, and the faces of the nozzle flanges, shall be protected from spills, runs and droppings. In the event of such occurrences, all such surfaces must be cleaned and returned to their original condition by the applicator at his expense and to the satisfaction of the Calgon Engineer.
- 3.5 Surfaces to which prime and intermediate coats will be applied shall be cleaned of all dirt, rust, scale, grease or other foreign matter as called for in the Steel Structure Painting Council Spec. No. SP6-63, Commercial Blast. All surfaces shall be inspected and approved by the Calgon Engineer prior to painting.

RS7.2

3.0 PERFORMANCE (Cont'd)

- 3.6 The minimum dry film thicknesses shall be as follows, unless otherwise recommended by the paint manufacturer:
- | | |
|-------------------|------------|
| Prime coat | - 3.0 mils |
| Intermediate coat | - 5.0 mils |
- 3.7 Foreign materials which come in contact with previously painted surfaces shall be removed prior to application of succeeding coats.
- 3.8 All paints and thinners shall be delivered to the applicator in closed containers with seals unbroken and manufacturer's labels intact.
- 3.9 Paints and thinners shall be mixed in strict accordance with the manufacturer's recommendations for the particular material and coat to be applied. Materials shall be thoroughly stirred before application and shall be repeatedly stirred during application.
- 3.10 Brush coats shall be carefully worked into the surfaces in an even film free from runs, skips, laps, streaks, holidays, etc.
- 3.11 Spray painting shall be done only upon approval of the Calgon Engineer. Spray coats shall be equal in all respects to high quality brush work.
- 3.12 Succeeding coats shall not be applied until the preceeding coat is thoroughly dry and has been checked to the satisfaction of the Calgon Engineer. At this time a dry film thickness test shall be made to determine if the coating is up to the required level.
- 3.13 No painting work shall be done outdoors during damp, frosty or rainy weather, nor shall it be done indoors or outdoors when the temperature is below 50°F and falling or when the relative humidity exceeds 70%.
- 3.14 At the conclusion of the painting work, a stencil or hand lettered sign, with 2½" letters in contrasting colors, shall be applied by the painter. The sign shall read as follows:

LINED VESSEL

WELDING ON VESSEL NOT PERMITTED

The location for these signs (2 required) shall be as indicated on the vessel drawings.

RS7.3

SECTION 3.0 BILL OF MATERIALS

CALGON CARBON SYSTEMS

PROJECT NO. 9209 CG BY WCT DATE 1-8-85
 PLANT LOCATION REILLY TAP, ST. LOUIS PARK, MINNESOTA CHKD. _____ DATE _____
 SUBJECT ADSORBERS, UNDERDRAIN, & SPRAY ASS'Y A.F.C. _____ DATE _____

REV.	NO. REQD.	SPEC. OR ITEM NO.	DESCRIPTION	ITEM COST	ORDER NUMBER	REQD. DLVY.	VENDOR
	1 EA.	V-1 & V-2	10'-0" DIA. X 14'-0" STRAIGHT SHELL CARBON STEEL ADSORBERS, COMPLETE WITH NOZZLES, MANWAY, LIFTING LUGS, INTERNAL & EXTERNAL CLIPS, SUPPORTS, BRACKETS, & LEGS ALL IN ACCORDANCE WITH DWGS. 9209 CG-106 (VESSEL V-1), & 9209 CG-107 (VESSEL V-2)				
	2	TOTAL	LINING; WISCONSIN COATINGS VINYL ESTER TYPE PLASITE #4020 AND SHALL HAVE A MINIMUM THICKNESS OF 40 MILS.				
	2		WTR. SPRAY ASSEMBLY PER DETAIL NO. 1 ON DWG. 9209 CG-105. EA. ASS'Y. REQUIRES THE FOLLOWING:				
		25.22	(1) - 2" SPRAY NOZZLE				
		P4	(1) - 2" SCR'D CPL'G				
		"	(1) - 2" PIPE X 2'-0" LG. (T.B.E.)				
		"	(1) - 6 7/8" O.D. X 3/4" THK. PPL BLIND SPACER W/ 2" FNPT ON CTR.				
		"	(2) - 6 7/8" O.D. X 4 1/2" I.D. X 1/8" THK. FLAT RING GSK.				

REV. 1 _____ REV. 3 _____
 REV. 2 _____ REV. 4 _____

BILL OF MATERIAL NO.

9209 CG-1

SHEET 1 OF 9

CALGON CARBON SYSTEMS

PROJECT NO. 9209 CG BY W.C.T. DATE 1-8-85
PLANT LOCATION REILLY TAP, ST. LOUIS PARK, MINNESOTA CHKD. _____ DATE _____
SUBJECT LINED PIPE & FITTINGS (L1 SPEC.) A.F.C. _____ DATE _____

[illegible]REV. 1 _____ REV. 3 _____REV. 2 REV. 4**BILL OF MATERIAL NO.**

9209 CG-1

SHEET 2 OF 9

CALGON CARBON SYSTEMS

PROJECT NO. 9209CG

BY W.C.T. DATE 1-8-85

PLANT LOCATION REILLY TAR, ST. LOUIS PARK, MINNESOTA

CHKD. _____ DATE _____

SUBJECT CI PIPE & FITTINGS

A.F.C. _____ DATE _____

REV.	NO. REQD.	SPEC. OR ITEM NO.	DESCRIPTION	ITEM COST	ORDER NUMBER	REQD. DLVY.	VENDOR
	60 FT.	CI	8" PIPE				
	210 FT.		6" PIPE				
	60 FT.		3" PIPE				
	10 FT.		4" PIPE				
	7		8" - 90° L.R. ELL.				
	30		6" " " "				
	1		4" " " "				
	4		3" " " "				
	4		6" - 45° ELL.				
	1		3" - " "				
	5		8" - STD. TEE				
	8		6" - " "				
	2		3" - " "				
	2		8" x 8" x 6" RED. TEE				
	2		8" x 6" CONX. RED.				
	9		1 1/2" THRD HALF CPLE				
	2		3/4" " " "				
	15		1/2" " " "				

REV. 1 _____ REV. 3 _____

REV. 2 _____ REV. 4 _____

BILL OF MATERIAL NO.

9209CG-1

SHEET 3 OF 9

CALGON CARBON SYSTEMS

PROJECT NO. 9209CG

BY W.C.T. DATE 1-8-85

PLANT LOCATION REILLY TAR, ST. LOUIS PARK, MINNESOTA

CHKD. _____ DATE _____

SUBJECT C1 PIPE & FITTINGS (CONT.)

A.F.C. _____ DATE _____

REV.	NO. REQD.	SPEC. OR ITEM NO.	DESCRIPTION	ITEM COST	ORDER NUMBER	RECD. DLVY.	VENDOR
	2	C1	8" - 150# W.N. FLG.				
	15		8" - 150# S.O. FLG.				
	1		8" - 150# BLIND FLG.				
	30		6" - 150# S.O. FLG.				
	12		6" - 150# W.N. FLG.				
	1	1	4" - 150# S.O. FLG.				
	9		3" - 150# W.N. FLG.				
	9		3" - 150# S.O. FLG.				
	2		10" x 8" S.O. RED. FLG. x 16" O.D.				
	1		6" - 150# BLIND FLG.				
	3		13 ³ / ₈ " O.D. x 10 ³ / ₄ " I.D. FLAT. RING GSK. x 1/16" THK.				
	8		11" O.D. x 8 ⁵ / ₈ " I.D. " " " " "				
	12		8 ³ / ₄ " O.D. x 6 ⁵ / ₈ " I.D. " " " " "				
	9		5 ³ / ₈ " O.D. x 3 ¹ / ₂ " I.D. " " " " "				
	9	P4	1" PPL RED. FLG. - 4 ¹ / ₄ " O.D. x 3/4" FNPT.				
	2	35.01	8" STD. RING SPACER x 1/2" THK.				
	4	35.01	6" " " " " X " "				
	3	35.01	3" " " " " X " "				

REV. 1 _____ REV. 3 _____

REV. 2 _____ REV. 4 _____

BILL OF MATERIAL NO.

9209CG-1

SHEET 4 OF 9

CALGON CARBON SYSTEMS

PROJECT NO. 9209CG BY W.C.T. DATE 1-8-85
 PLANT LOCATION REILLY TAR, ST. LOUIS PARK, MINNESOTA CHKD. _____ DATE _____
 SUBJECT C13 PIPE & FITTINGS A.F.C. _____ DATE _____

REV.	NO. REQD.	SPEC. OR ITEM NO.	DESCRIPTION	ITEM COST	ORDER NUMBER	REQD. DLVY.	VENDOR
	140 FT.	C13	2" PIPE				
	120 FT.		1 1/2" PIPE				
	20 FT.		1/2" PIPE				
	14		2"-90° EL.				
	16		1 1/2" - " "				
	4		1/2" - " "				
	2		2" - 45° EL.				
	6		2" TEE				
	3		1 1/2" TEE				
	3		2" x 1 1/2" CONC. REDUCER				
	1		2" PIPE CAP				
	1		1 1/2" PIPE CAP				
	6		2" UNION				
	6		1 1/2" UNION				
	6		2" CPL'G.				
	4		1 1/2" CPL'G.				
	3		9" O.D. x 2"-150 TH THR'D RED. FLG.				
	5		4"-150 TH THR'D FLG. (TO BE USED WITH 32.32-4")				

REV. 1 _____ REV. 3 _____

REV. 2 _____ REV. 4 _____

BILL OF MATERIAL NO.

9209CG-1

SHEET 5 OF 9

CALGON CARBON SYSTEMS

PROJECT NO. 9209CG

BY W.C.T. DATE 1-8-85

PLANT LOCATION REILLY TAR, ST. LOUIS PARK, MINNESOTA

CHKD. _____ DATE _____

SUBJECT BOLTING MATERIAL

A.F.C. _____ DATE _____

REV.	NO. REQD.	SPEC. OR ITEM NO.	DESCRIPTION	ITEM COST	ORDER NUMBER	REQD. DLVY.	VENDOR
			LOT OF STD. HEX HD. MACH. BOLTS ASTM A307				
			GR. B, C. STL., CADMIUM PLATED ANSI B18.2				
			W/1 HVY. SEMI-FINISHED CADMIUM PLATED HEX				
			NUT & LOCK WASHER PER BOLT, EA. STD				
			TO HAVE TWO HEX NUTS & TWO LOCK WASHERS				
	80		5/8" ϕ x 6" LG. STUDS (FOR 4" INST. TEE)				
	32		3/4" ϕ x 3 1/2" LG. BOLT (FOR 8" JT.)				
	40		3/4" ϕ x 4" LG. BOLT (FOR 8" JT'S W/ 1/2" SPACERS)				
	32		3/4" ϕ x 6" LG. BOLT (FOR 8" JT. @ 3.11 VA.)				
	24		1/8" ϕ x 5 1/4" LG. BOLT (FOR 10" JT. @ NOZZLE "E")				
	24		3/4" ϕ x 3 3/4" LG. (FOR 6" JT. W/ SPACER)				
	80		3/4" ϕ x 5 1/4" LG. (FOR 6" JT. @ 3.11 VA.)				
	48		3/4" ϕ x 3 1/4" LG. (FOR 6" JT.)				
	16		5/8" ϕ x 3 3/4" LG. (FOR 4" JT. ON NOZZLE "A" P.W. COND.)				
	172		5/8" ϕ x 3" LG. (FOR 4" JT.)				
	12		5/8" ϕ x 3 1/2" LG. (FOR 3" JT. W/ 1/2" THK. SPACER)				
	12		5/8" ϕ x 4" LG. (FOR 3" JT. @ PSE-252)				
	12		5/8" ϕ x 5" LG. (FOR 3" JT. @ 3.11 VA.)				
	80		1/2" ϕ x 1 3/4" LG. (FOR 1" JT.)				
	40		5/8" ϕ x 11" LG. STUDS (FOR 4" SIGHT GLASS 23.29)				

REV. 1 _____ REV. 3 _____

BILL OF MATERIAL NO.

9209CG-1

REV. 2 _____ REV. 4 _____

SHEET 6 OF 9

CALGON CARBON SYSTEMS

PROJECT NO. 9209CG
 PLANT LOCATION REILLY TAP, ST. LOUIS PARK, MINNESOTA
 SUBJECT VALVES & SPECIALTIES

BY W.C.T. DATE 1-8-85
 CHKD. _____ DATE _____
 A.F.C. _____ DATE _____

REV.	NO. REQD.	SPEC. OR ITEM NO.	DESCRIPTION	ITEM COST	ORDER NUMBER	REQD. DLVY.	VENDOR
	2	3.11	8" BUTTERFLY VA. (W/GEAR OPERATOR & CHAIN WHEEL)				
	2	3.11	6" " " " " " "				
	2	3.11	8" BUTTERFLY VA.				
	10	3.11	6" " "				
	2	3.11	3" " "				
	4	6.12	4" PLUG VA. LINED				
	9	6.12	1" PLUG VA. LINED				
	6	4.04	1/2" BALL VA.				
	4	2.10	1/2" GLOBE VA.				
	2	8.01	2" CHECK VA.				
	7	8.01	1 1/2" " "				
	2	1.01	2" GATE VA.				
	7	1.01	1 1/2" " "				
	4	1.01	1/2" " "				

REV. 1 _____ REV. 3 _____
 REV. 2 _____ REV. 4 _____

BILL OF MATERIAL NO.

9209CG-1

SHEET 7 OF 9

CALGON CARBON SYSTEMS

PROJECT NO. 9209 CG

BY W.C.T. DATE 1-8-85

PLANT LOCATION REILLY TAR, ST. LOUIS PARK, MINNESOTA

CHKD. _____ DATE _____

SUBJECT SPECIALTIES & INSTRUMENTS

A.F.C. _____ DATE _____

REV.	NO. REQD.	SPEC. OR ITEM NO.	DESCRIPTION	ITEM COST	ORDER NUMBER	REQD. DLVY.	VENDOR
	5	32.32	4" HOSE CONNECTION				
	9	32.32	3/4" " "				
	6	32.32	1/2" " "				
	4	23.29	4" SIGHT GLASS				
	2	31.54	4" CARBON TRANSFER HOSE X 25'-0" LG.				
	1	31.52	3/4" FLUSH WATER HOSE X 25'-0" LG.				
	1	31.52	2" WATER HOSE X 50'-0" LG.				
	1	31.52	1 1/2" AIR HOSE X 50'-0" LG.				
	3	PSE-252	3" RUPTURE DISK PER SPEC. 7209A-CS172 REV. 2 (FOR USE ON 3" VENT PIPING FROM ADSORBERS)				
	4	PI-216	PRESSURE INDICATING GAUGE, RANGE 0-100 PSIG PER SPEC. 7209A-CS263				

REV. 1 _____ REV. 3 _____

REV. 2 _____ REV. 4 _____

BILL OF MATERIAL NO.

9209 CG-1

SHEET 8 OF 9

CALGON CARBON SYSTEMS

PROJECT NO. 9209CG

BY W.C.T. DATE 1-8-85

PLANT LOCATION REILLY TAIL ST. LOUIS PARK, MINNESOTA

CHKD. _____ DATE _____

SUBJECT INSTRUMENTS

A.F.C. _____ DATE _____

[illegible]

REV. 1 REV. 3

REV. 2 REV. 4**BILL OF MATERIAL NO.**

9209 CG-1

SHEET 9 OF 9

CALGON CARBON SYSTEMS

PROJECT NO. 9209CG - REILLY TAR
 PLANT LOCATION ST. LOUIS PARK, MINNESOTA
 SUBJECT MAT'L. FOR (2) ADSORBER UNDERDRAINS

BY R DATE 1-10-85
 CHKD. _____ DATE _____
 A.F.C. _____ DATE _____

REV.	NO. REQD.	SPEC. OR ITEM NO.	DESCRIPTION	ITEM COST	ORDER NUMBER	REQD. DLVY.	VENDOR
	10 FT.	316 S.S.TL.	8" SCH. 40S PIPE				
	50 FT.		6" SCH. 10S PIPE				
	4		6" SCH. 10S-90° B.W. ELL				
	2		8" SCH. 10S B.W. TEE				
	4		6" SCH. 10S B.W. TEE				
	8		6" SCH. 10S B.W. CAP				
	100		1"- 3000# THR'D. HALF CPL'G.				
	2		1/4" TK. FLANGE - PER DET. "14" - DWG. 9209CG-101				
	8		1/2" TK. FLANGE - " "15" - "				
	16		1/2" TK. FLANGE - " "16" - "				
	4		1/2" TK. FLANGE - " "17" - "				
	45 LF		6" x 3" x 3/8" L				

REV. 1 _____ REV. 3 _____
 REV. 2 _____ REV. 4 _____

BILL OF MATERIAL NO.

9209CG-2

SHEET 1 OF 2

CALGON CARBON SYSTEMS

PROJECT NO. 9209 CG - REILLY TAR
PLANT LOCATION ST. LOUIS PARK, MINNESOTA
SUBJECT MAT'L. FOR (2) ADSORBER UNDERDRAINS

BY RE DATE 1-10-85
CHKD. _____ DATE _____
A.F.C. _____ DATE _____

[illegible]

REV. 1 _____ REV. 3 _____
REV. 2 _____ REV. 4 _____

BILL OF MATERIAL NO.

9209 CG-2

SHEET 2 OF 2

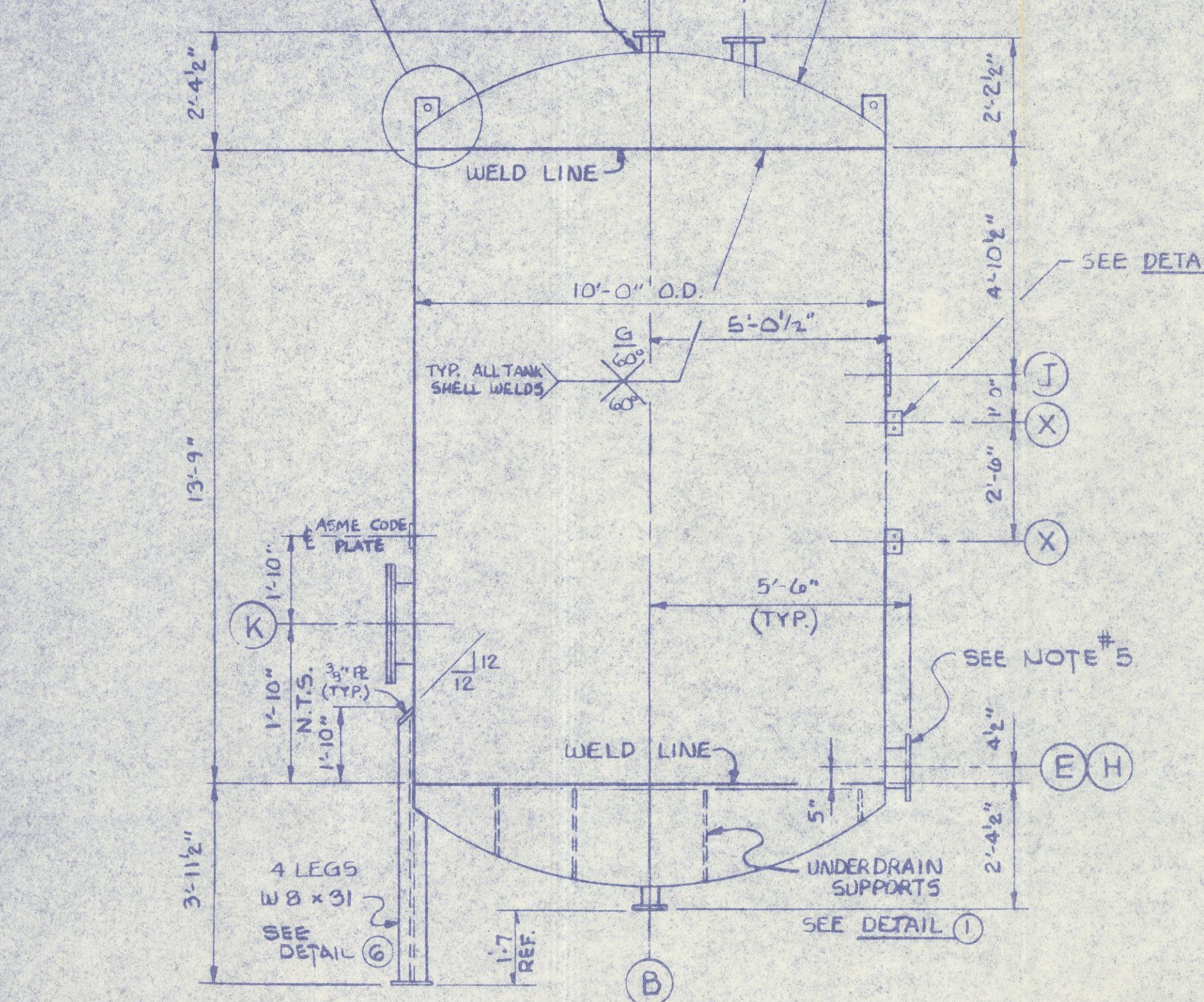
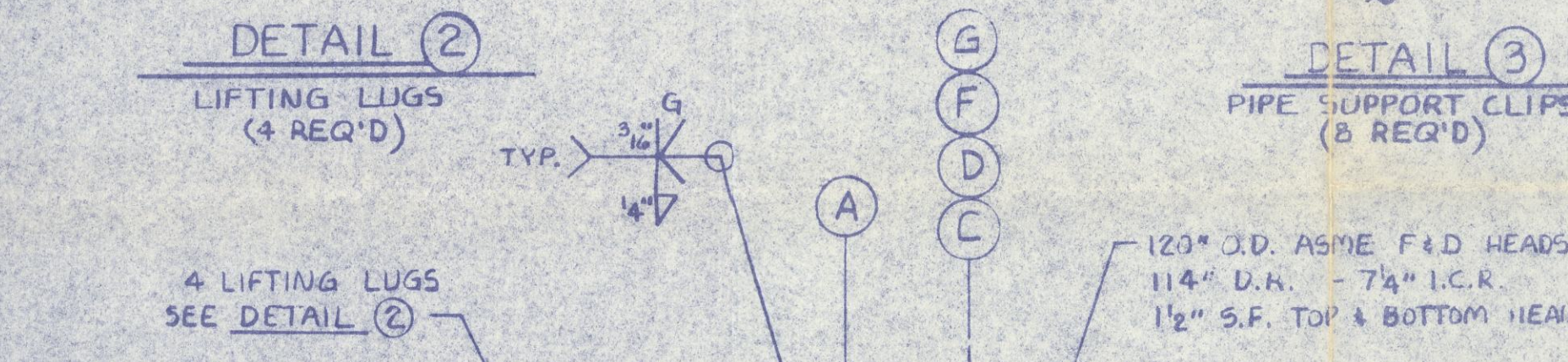
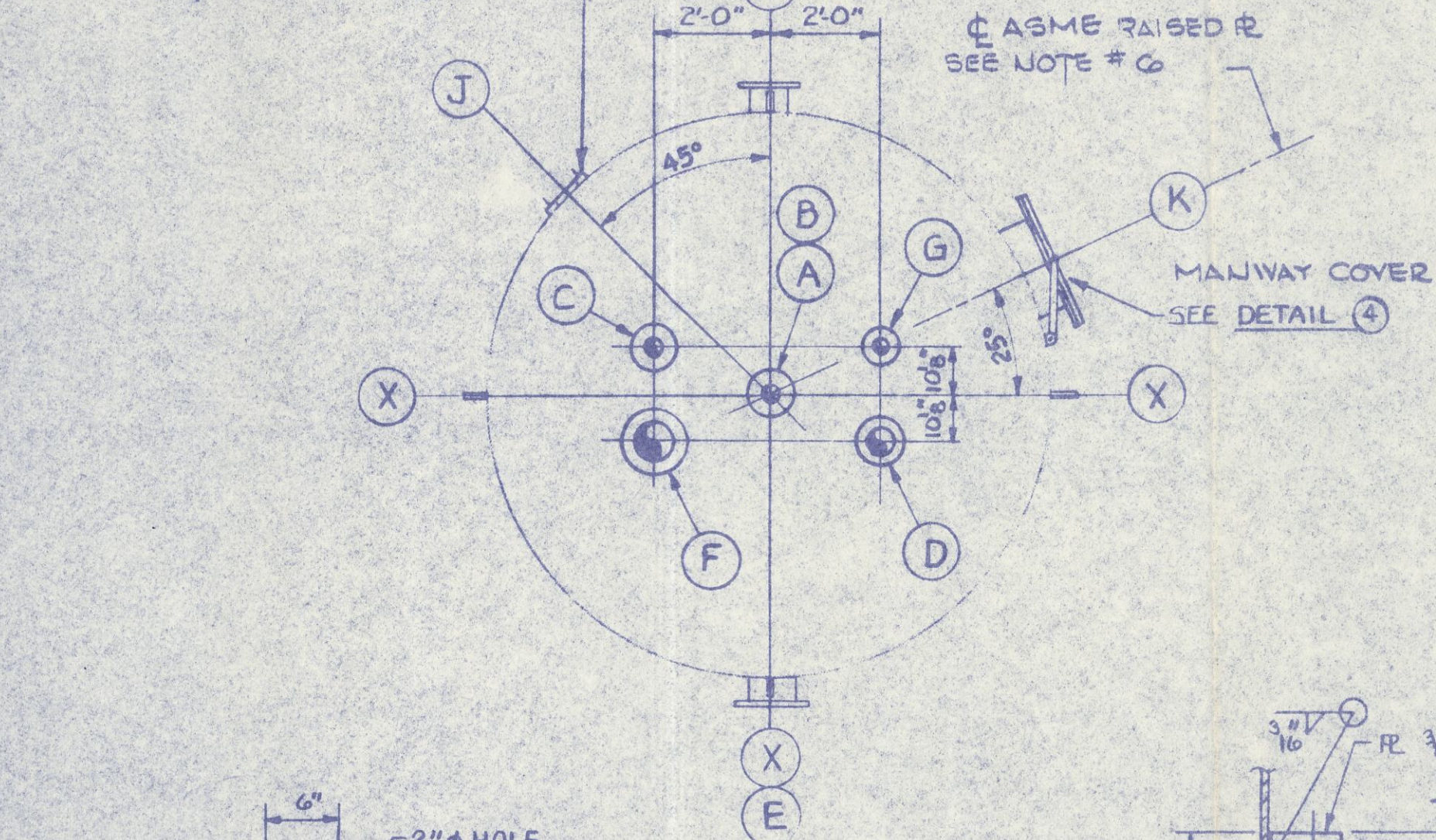
SECTION 4.0 REFERENCE DRAWINGS

<u>Drawing Number</u>	<u>Title</u>
9209CG-100	Anchor Bolt Location Plan and Details
9209CG-101	Adsorber Underdrain
9209CG-102	Backwashable Series Design System Flow Diagram
9209CG-103	Backwashable Series Design System -Piping Plan-
9209CG-104	Backwashable Series Design System -Piping Sections-
9209CG-105	Backwashable Series Design System -Piping Sections & Details-
9209CG-106	Standard 10' x 14' lined carbon steel adsorber
9209CG-107	Standard 10' x 14' lined carbon steel adsorber

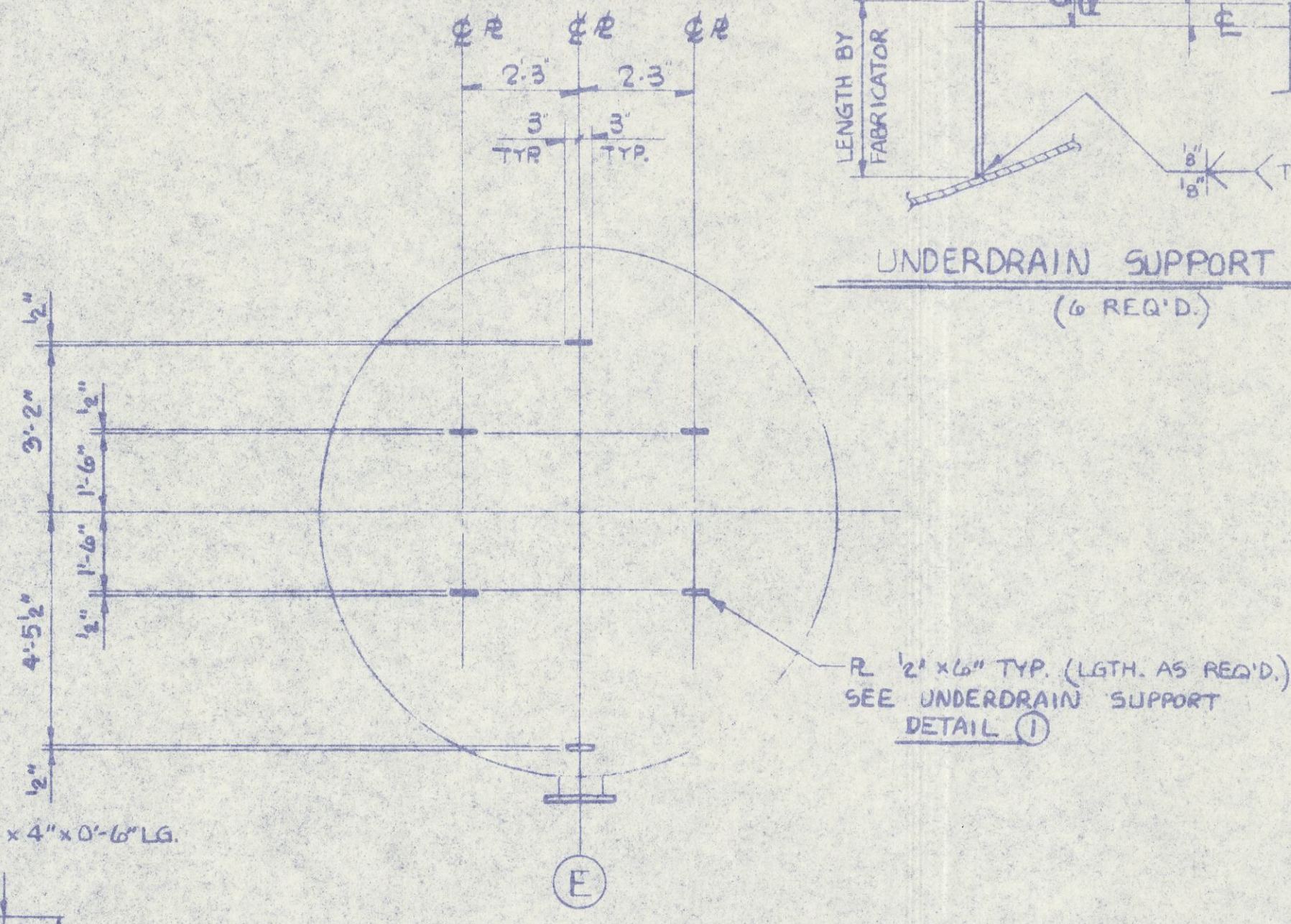
NOTES:

- (1) Drawing #9209CG-100 is intended to provide anchor bolt locations, equipment orientations, and load bearing requirements, it is not intended as a design for foundations, pads, and trench.
- (2) The foundation and drainage trench details appearing on drawing #9209CG-103 and #9209CG-104 are included as equipment orientation aids and are not a design for this project.

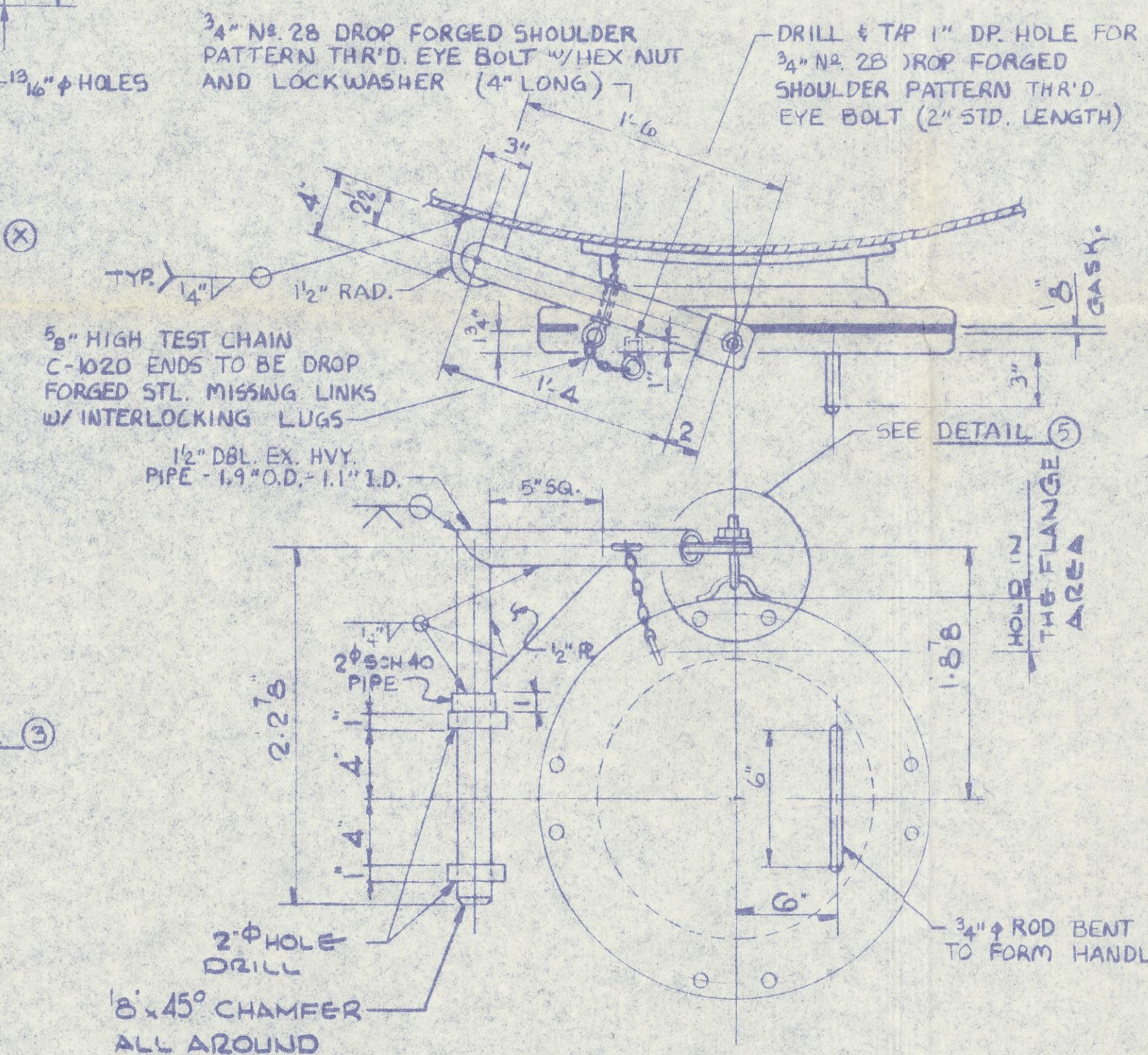
NOTE:
PAD FLANGE "J" TO HAVE
4" STUD PROJECTION



ELEVATION



UNDERDRAIN SUPPORT ORIENTATION PLAN

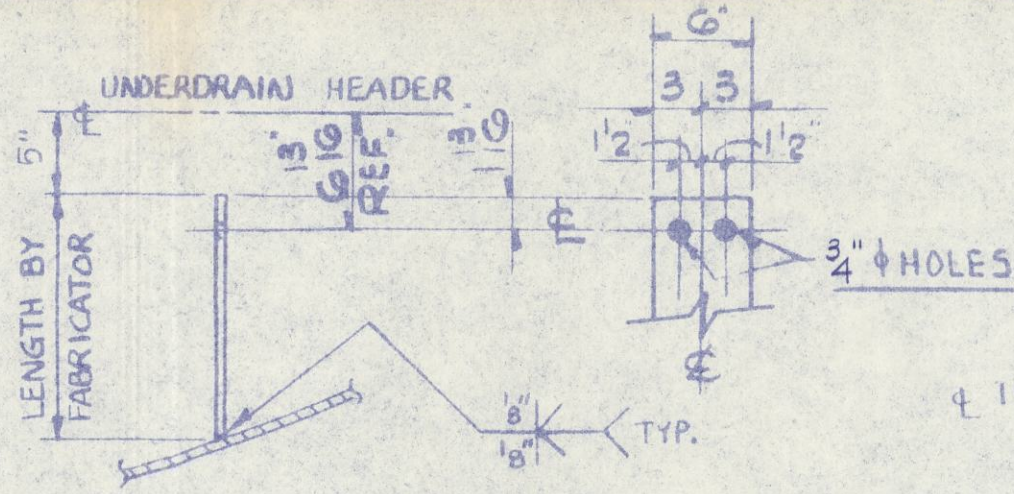


DETAIL (4)

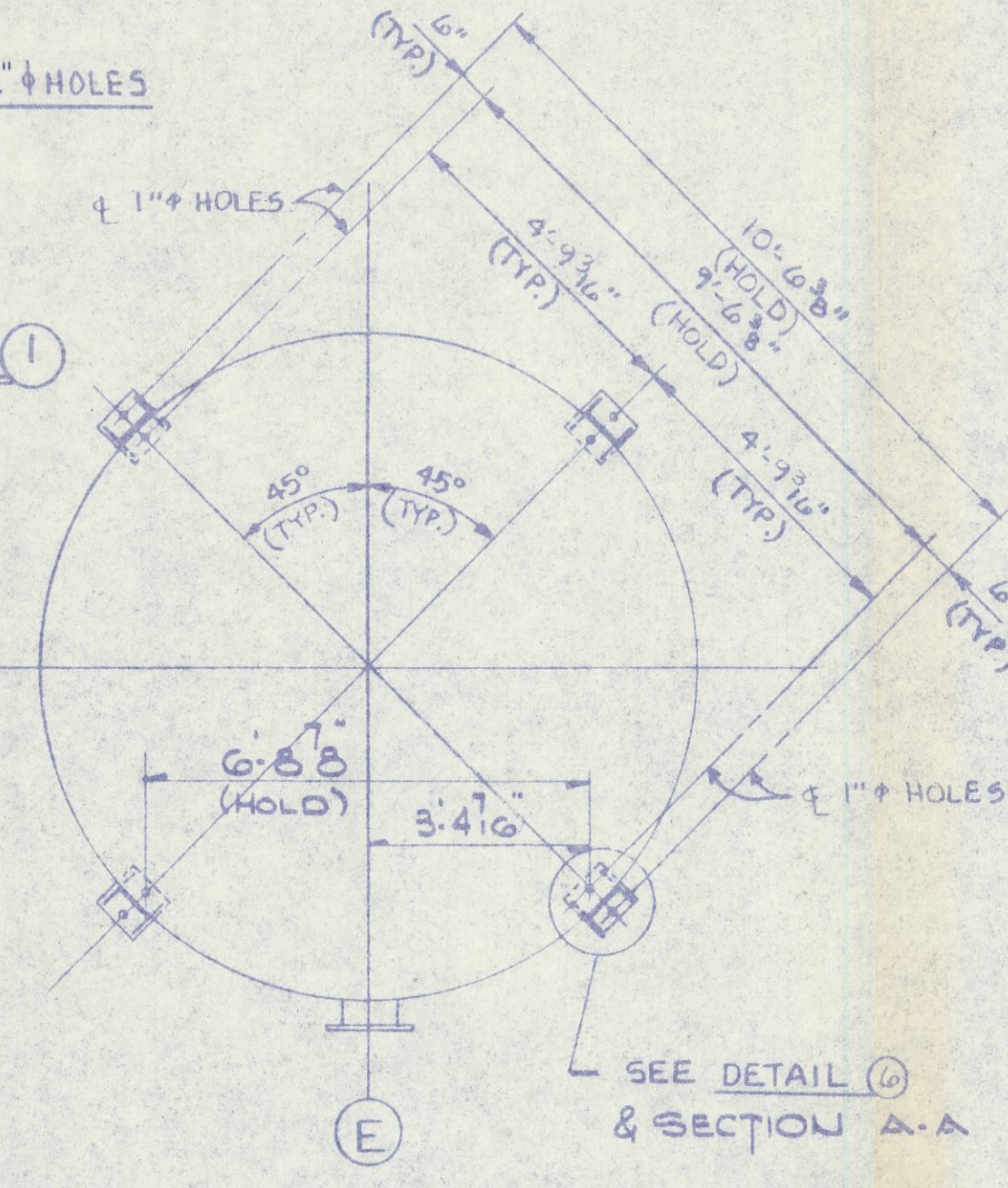
REMOVABLE DAVIT FOR 20" MANWAY

NOTES:

1. L.J. IN SCHEDULE INDICATES LAP JOINT FLANGES.
2. ALL INTERIOR WELDS & EDGES TO BE GRIND SMOOTH SUITABLE TO RECEIVE LINING MATERIAL.
3. ALL NOZZLES MUST BE FLUSH ON INSIDE OF SHELL.
4. MANWAY SHALL BE MFR'S STD. WITH 150# DRILLING TO BE COMPLETE W/BOLTS, NUTS & FULL FACE GASKET.
5. FOR CODE REQUIREMENTS OF OPENINGS IN OR ADJACENT TO WELDS SEE ASME BOILER & PRESSURE VESSEL CODE SECTION VIII, DIVISION 1; UNF-14
6. USE MISC. ANGLE OR ADEQUATE STRUCTURAL MATERIAL AS A DIAGONAL BRACE ON LEGS FOR SHIPPING. (TACK WELD)
7. VERTICAL BEAMS IN VESSEL SHELL ARE TO BE LOCATED TO AVOID INTERFERENCE WITH SUPPORT LEGS, FLANGES, NOZZLES, AND PIPE SUPPORT CLIPS.
8. VACUUM RINGS NOT PERMITTED

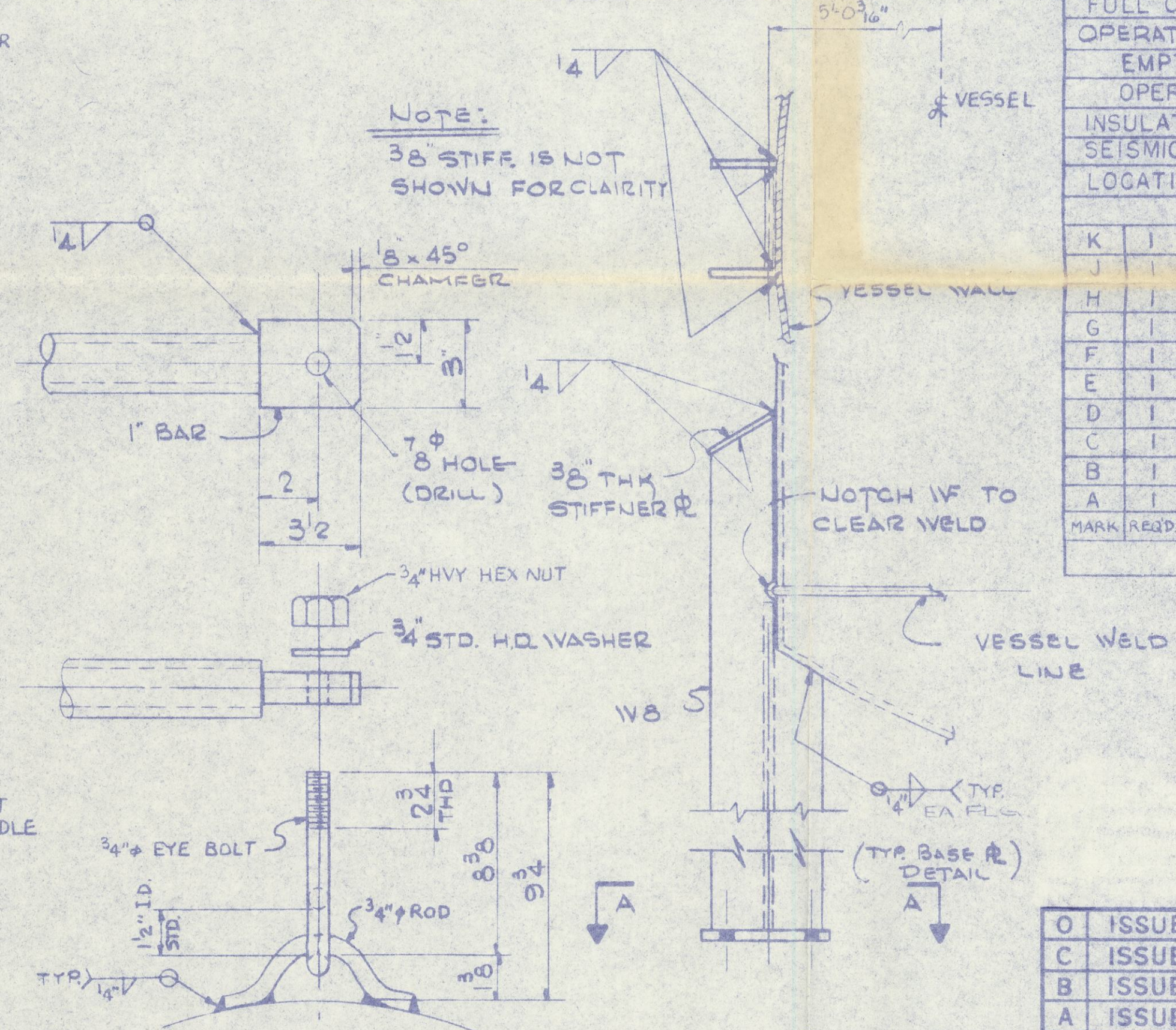


UNDERDRAIN SUPPORT DETAIL (1)
(6 REQ'D.)



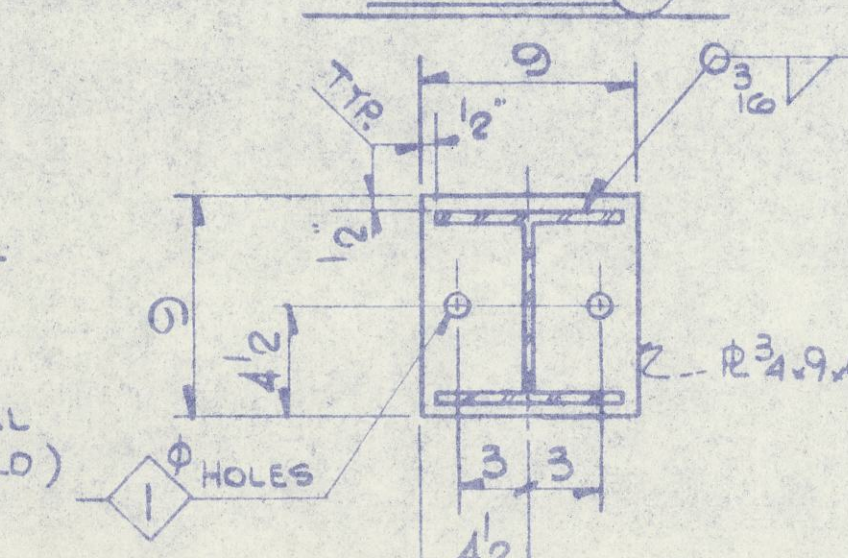
BASE PLATE ORIENTATION PLAN

NOTE:
38" STIFF. IS NOT
SHOWN FOR CLAIRI



DETAIL (5)

VESEL SUPPORT LEGS
(4 REQD)



SECTION A-A

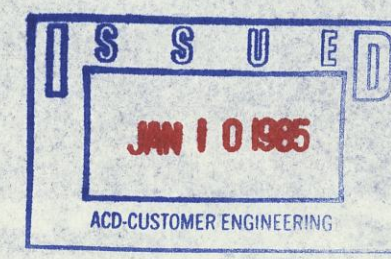
ITEM NO.	1 - 2	NO REQ. SEE BILL OF MAT'L
REFERENCE:	(NATIONAL BOARD N° 376)	
VESSEL SPECIFICATION 7209A-VSI		
DESIGN CONDITIONS		
SHELL FULL VACUUM	125 PSIG	150° F
OPERATING CONDITIONS		
SHELL	PSIG	
MATERIALS		
SHELL HEADS CARBON STEEL		
NOZZLES, ETC. CARBON STEEL EXCEPT AS NOTED		
LINING BY OTHERS (SEE BILL OF MAT'L)		
GASKETS 1/8" THK NEOPRENE (45 TO 55 DUROMETER)		
BOLTING A-307B		
SUPPORTS CARBON STEEL A-36		
CORROSION ALLOWANCE NONE		
THICKNESS MINIMUM TO BE		
SHELL — PER CODE REQUIREMENTS		
CONSTRUCTION FUSION WELDED		
CODE ASME SECT. VIII DIV. 1 OR 2		
STRESS RELIEF RADIOGRAPH — SPOT		
TESTING — HYDROSTATIC PER CODE		
INSPECTION — BY BUYER & APPROVED CODE AGENCY		
STAMPING — A.S.M.E.		
NAME PLATE — CALGON (MTG. BRACKET BY FAB.)		
PAINT — CLEAN AND SHOP PRIME IN		
ACCORDANCE WITH SPEC N° 7209A-RSS		

— ESTIMATED WEIGHT —

FULL CAPACITY	9400 GAL	PROD. SP. GR. 1.2 MEAN
OPERATING CAPACITY	9400 GAL.	% FILL 100
EMPTY	14,000 LB.	FULL H ₂ O 93,000 LB.
OPERATING	104,200 LB.	FULL PRODUCT 104,200 LB.
INSULATING SUPPORTS - NONE		
SEISMIC LOADING		
LOCATION		

K	I	20"	MFG.	F.F.	MANWAY & COVER (SEE NOTE)
J	I	6"	150*	PAD	DRAIN
H	I	8"	150*	SLIP-ON FLANGED	SPARE
G	I	3"	150*	L.J.	VENT
F	I	8"	150*	L.J.	BACKWASH OUTLET
E	I	10"	150*	L.J.	TREATED WATER OUTLET
D	I	6"	150*	L.J.	FILTERED WATER INLET
C	I	4"	150*	L.J.	CARBON INLET
B	I	4"	150*	L.J.	CARBON OUTLET
A	I	4"	150*	L.J.	SPRAY WATER INLET
MARK REQ'D	SIZE	DRILLING	FACING	DESCRIPTION	
NOZZLE SCHEDULE					

NOZZLE SCHEDULE



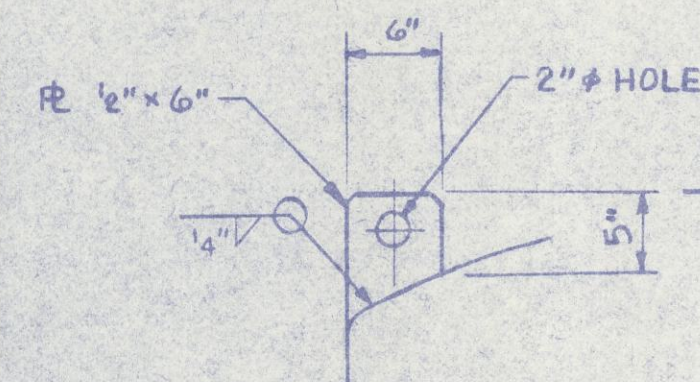
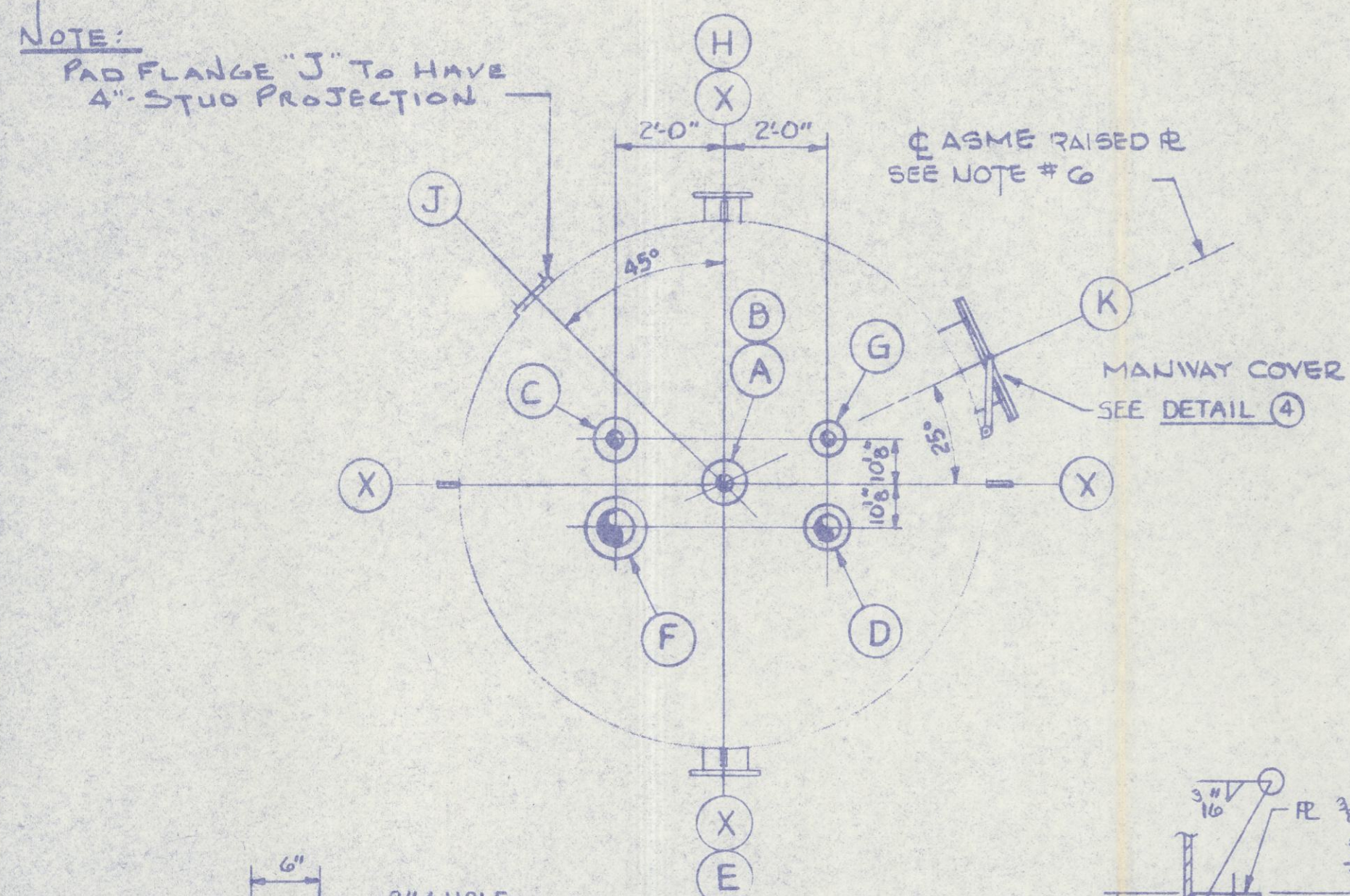
SUBMITTED FOR APPROVAL

O	ISSUED FOR CONSTRUCTION			
C	ISSUED FOR INFORMATION			
B	ISSUED FOR BID			
A	ISSUED FOR APPROVAL			
NO.	REVISION	BY	DATE	FILM

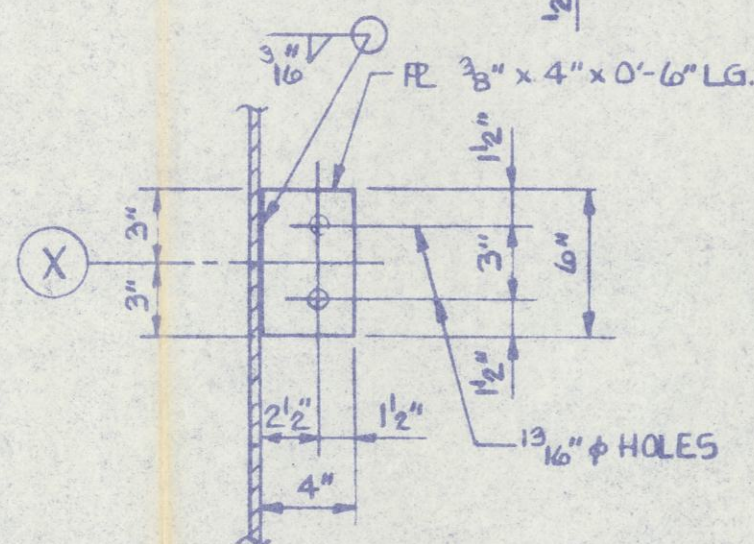
PLANT REILLY TAR, ST. LOUIS PARK, MINNESOTA			
TITLE STANDARD 10' x 14' LINED C. STL. ADSORBER			
DRAWN <i>RR</i>	CHECKED	APPROVED	SCALE NONE
PROJECT 9209CG	DRAWING NO 9209CG - 107		REV A



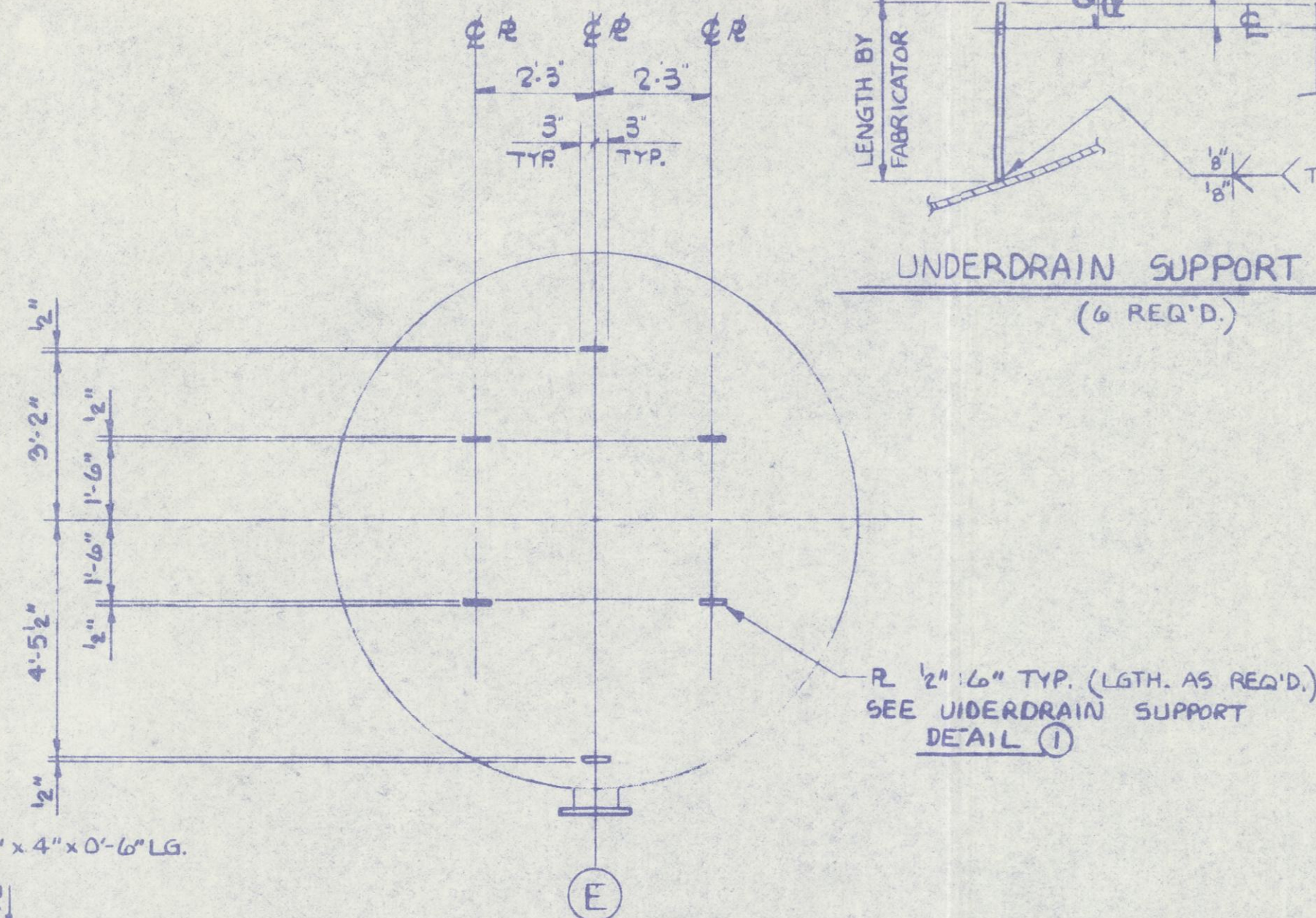
NOTE:
PAD FLANGE "J" TO HAVE
4" STUD PROJECTION.



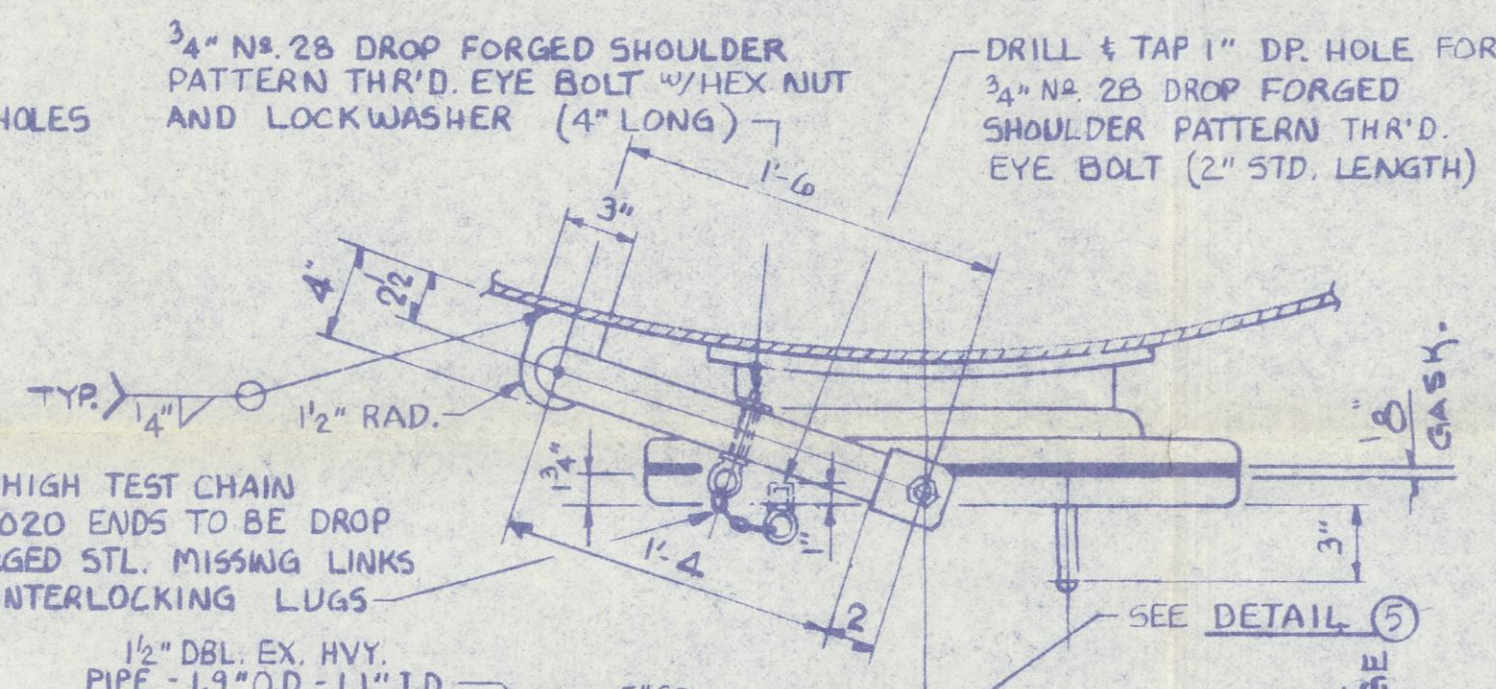
ORIENTATION PLAN



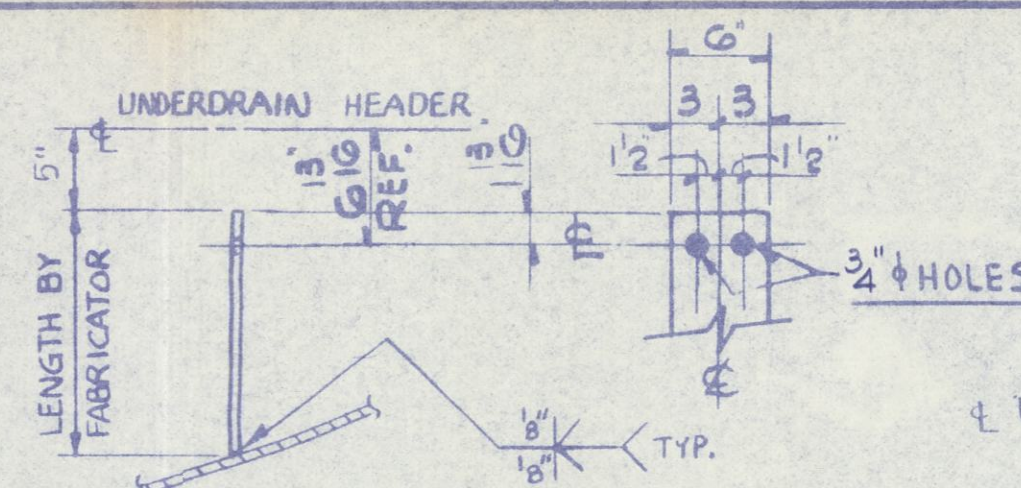
DETAIL (3)
PIPE SUPPORT CLIPS (X)
(8 REQ'D)



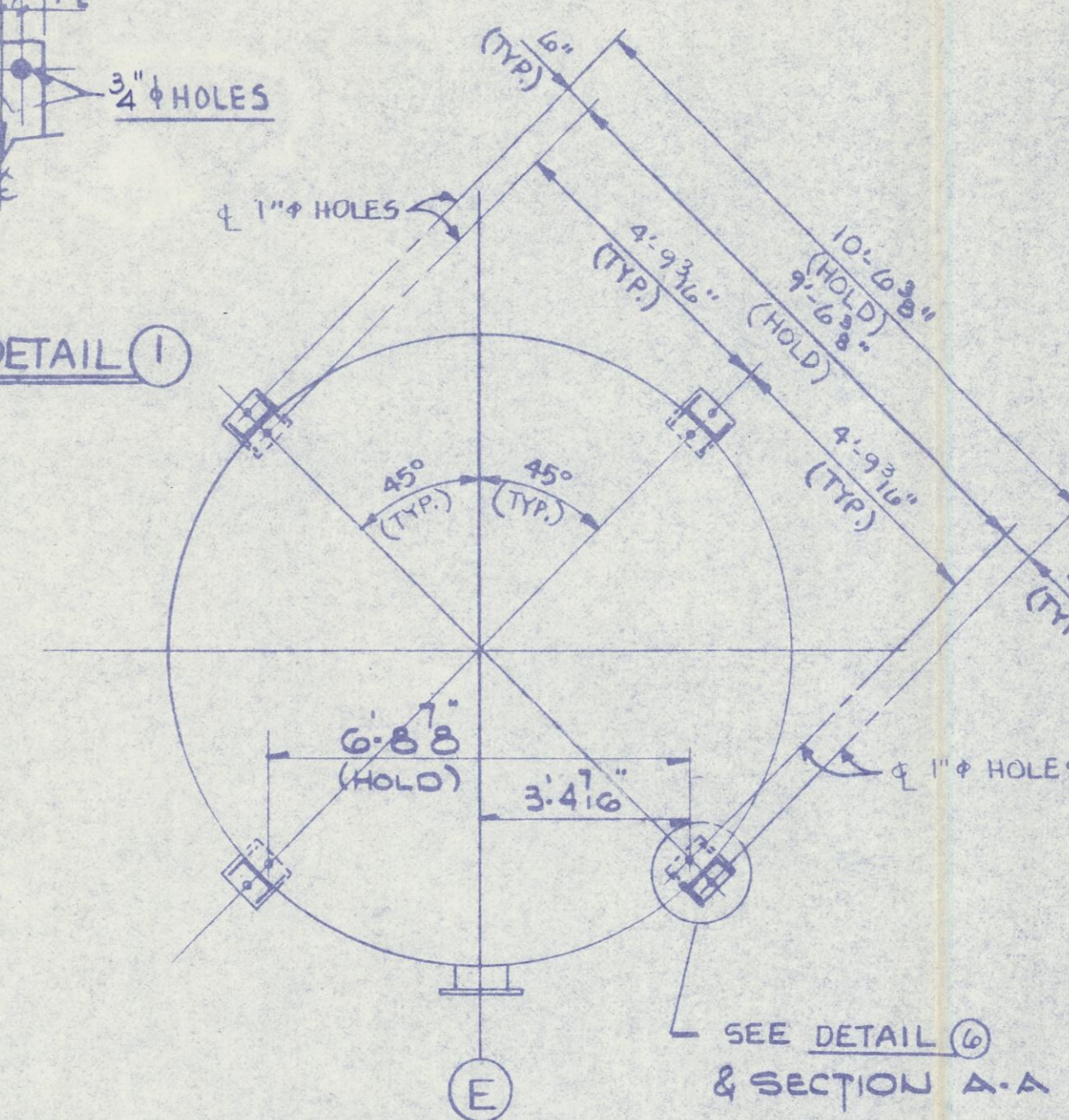
UNDERDRAIN SUPPORT ORIENTATION PLAN



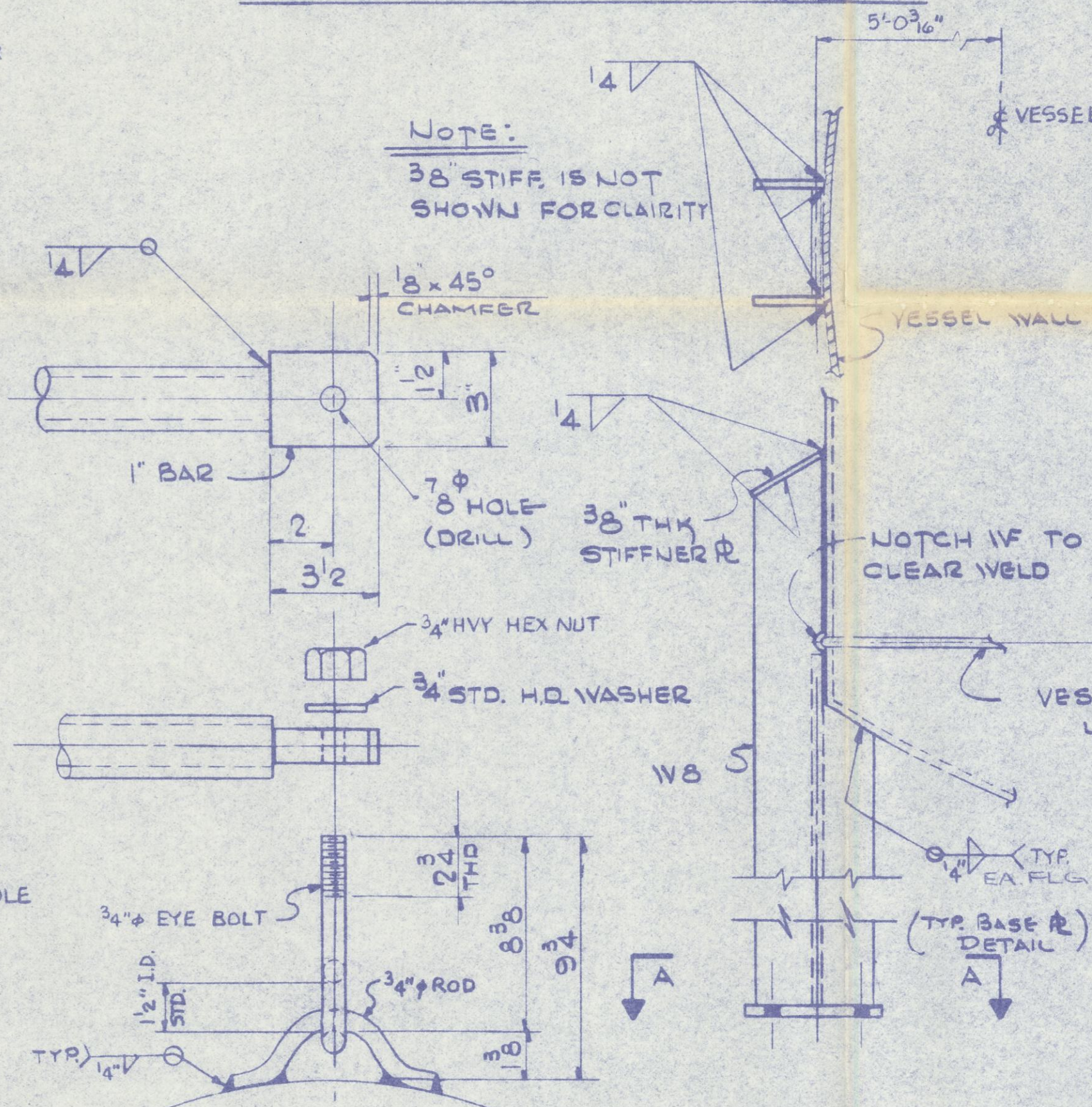
DETAIL (4)
REMOVABLE DAVIT FOR 20" MANWAY



UNDERDRAIN SUPPORT DETAIL (1)

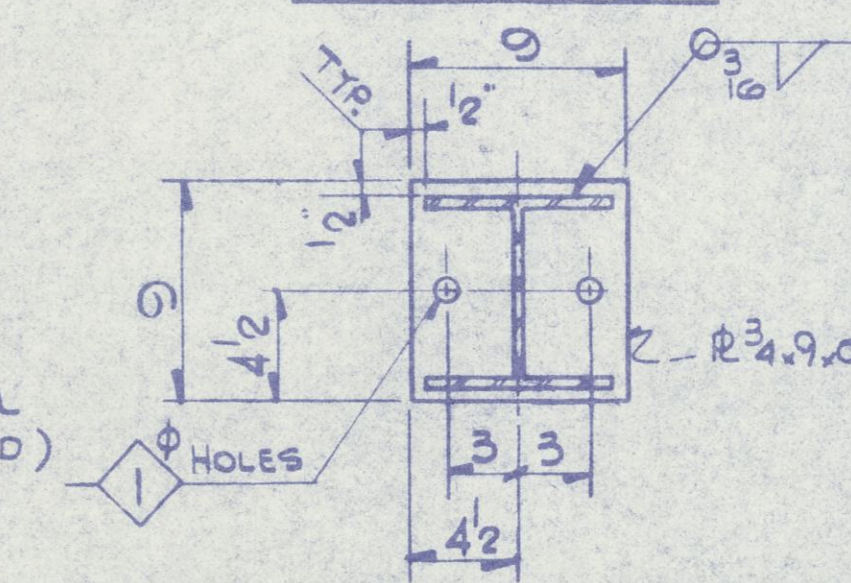


BASE PLATE ORIENTATION PLAN

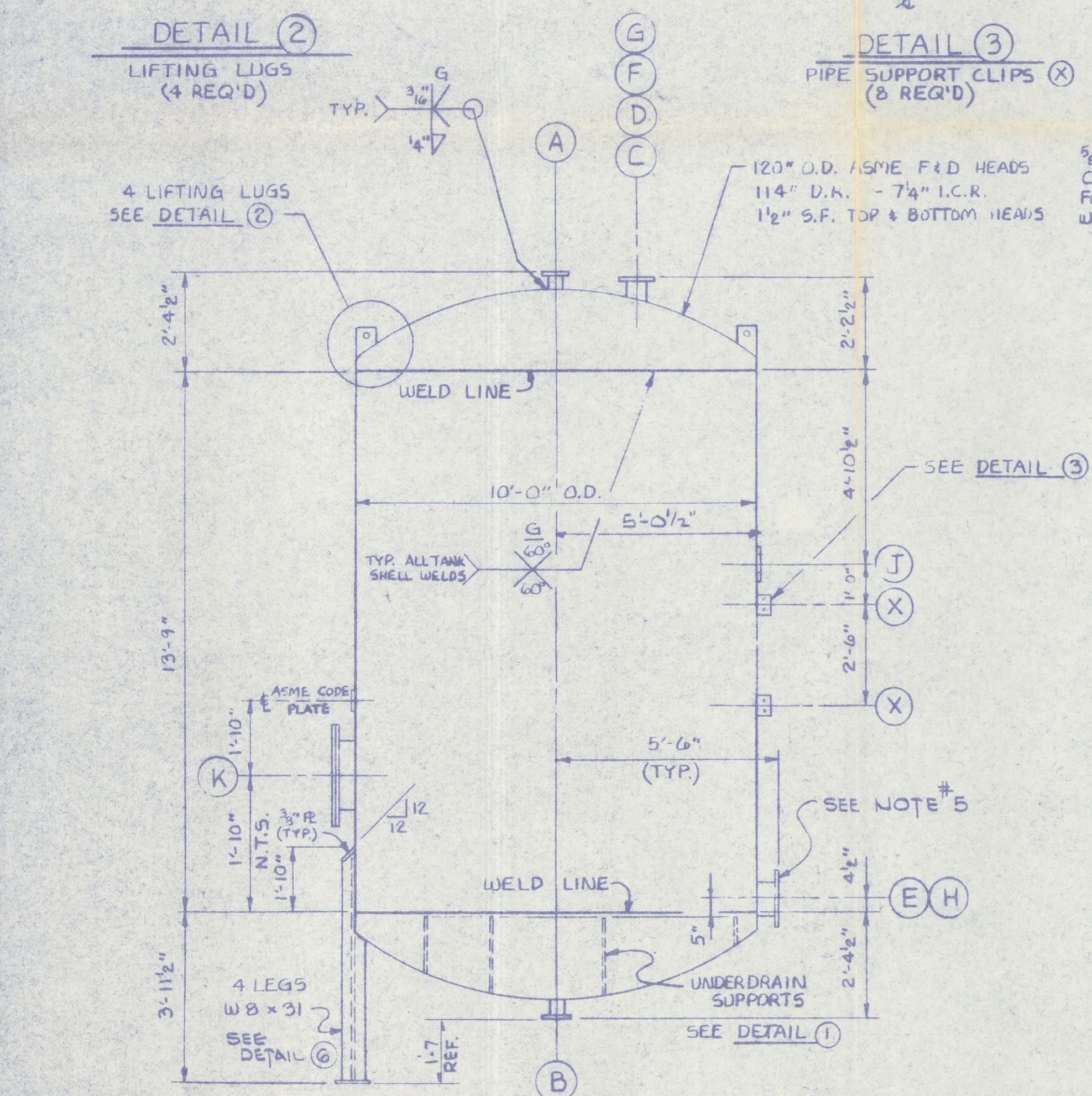


DETAIL ⑤

DETAIL (6)
VESSEL SUPPORT LEGS
(4 REQD)



SECTION A-A



ELEVATION

- ## NOTES:
1. L.J. IN SCHEDULE INDICATES LAP JOINT FLANGES.
 2. ALL INTERIOR WELDS & EDGES TO BE GRIND SMOOTH SUITABLE TO RECEIVE LINING MATERIAL.
 3. ALL NOZZLES MUST BE FLUSH ON INSIDE OF SHELL.
 4. MANHOLE SHALL BE MFR'S STD. WITH 150# DRILLING TO BE COMPLETE W/BOLTS, NUTS & FULL FACE GASKET.
 5. FOR CODE REQUIREMENTS OF OPENINGS IN OR ADJACENT TO WELDS SEE ASME BOILER & PRESSURE VESSEL CODE SECTION VIII DIVISION 1; UIV-14
 6. USE MISC. ANGLE OR ADEQUATE STRUCTURAL MATERIAL AS A DIAGONAL BRACE ON LEGS FOR SHIPPING. (TACK WELD)
 7. VERTICAL SEAMS IN VESSEL SHELL ARE TO BE LOCATED TO AVOID INTERFERENCE WITH SUPPORT LEGS, FLANGES, NOZZLES, AND PIPE SUPPORT CLIPS.
 8. VACUUM RINGS NOT PERMITTED

ITEM NO V- 1 NO REQ'D SEE BILL OF MAT'L

REFERENCE: (NATIONAL BOARD N° 9719)

VESSEL SPECIFICATION 7209A-V51

DESIGN CONDITIONS

SHELL FULL VACUUM & 150 PSIG 150° F

OPERATING CONDITIONS

SHELL PSIG

MATERIALS

SHELL HEADS CARBON STEEL

NOZZLES, ETC. CARBON STEEL EXCEPT AS NOTED

LINING BY OTHERS (SEE BILL OF MAT'L)

GASKETS 1/8" THK NEOPRENE (45 TO 55 DUROMETER)

BOLTING A-307 B

SUPPORTS CARBON STEEL A-36

CORROSION ALLOWANCE NONE

THICKNESS MINIMUM TO BE

SHELL — PER CODE REQUIREMENTS

CONSTRUCTION FUSION WELDED

CODE ASME SECT. VIII DIV. 1 OR 2

STRESS RELIEF RADIOGRAPH — SPOT

TESTING — HYDROSTATIC PER CODE —

INSPECTION — BY BUYER & APPROVED CODE AGENCY

STAMPING — A.S.M.E.

NAME PLATE — CALGON (MTG. BRACKET BY FAB.)

PAINT — CLEAN AND SHOP PRIME IN

ACCORDANCE WITH SPEC N° 7209A-R50

= ESTIMATED WEIGHT =	
FULL CAPACITY	9400 GAL. PROD. SP. GR. 1.2 MEI
OPERATING CAPACITY	9400 GAL. % FILL 100
EMPTY	14,000 LB. FULL H ₂ O 93,000 LB.
OPERATING	104,200 LB. FULL PRODUCT 104,200 LB.
INSULATING SUPPORTS - NONE	
SEISMIC LOADING	
LOCATION	

K	I	20°	MFG.	F.F.	MANWAY & COVER (see Note)
I	I	6"	150*	PAD FLG. CO.	DRAIN
H	I	8"	150*	SLIP-ON & BLIND	SPARE
G	I	3"	150*	L. J.	VENT
F	I	8"	150*	L. J.	BACKWASH OUTLET
E	I	10"	150*	L. J.	TREATED WATER OUTLET
D	I	6"	150*	L. J.	FILTERED WATER INLET
C	I	4"	150*	L. J.	CARBON INLET
B	I	4"	150*	L. J.	CARBON OUTLET
A	I	4"	150*	L. J.	SPRAY WATER INLET
MARK	REQD.	SIZE	DRILLING	FACING	DESCRIPTION

NOZZLE SCHEDULE

ISSUED
JAN 10 1985
ACD-CUSTOMER ENGINEERING

SUBMITTED FOR APPROVAL

O	ISSUED FOR CONSTRUCTION			
C	ISSUED FOR INFORMATION			
B	ISSUED FOR BID			
A	ISSUED FOR APPROVAL			
NO.	REVISION	BY	DATE	FILM

PLANT REILLY TAR, ST. LOUIS PARK, MINNESOTA

STANDARD
10' x 14' LINED C. STL. ADSORBER

DRAWN <i>B</i>	CHECKED	APPROVED	SCALE NONE
PROJECT 9209CG	DRAWING NO. 9209CG-106		REV. A

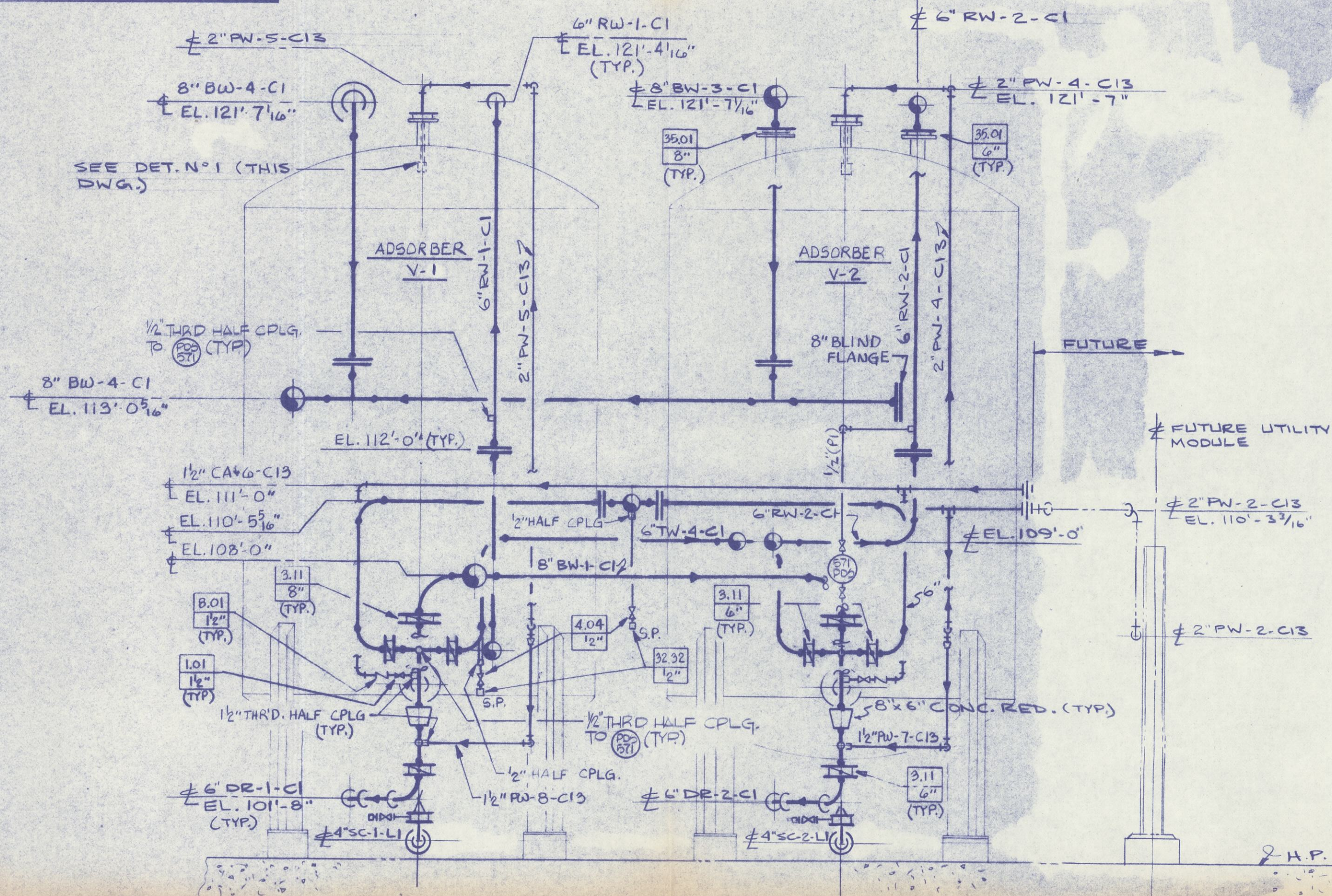


SUBSIDIARY OF MERCK & CO., INC.

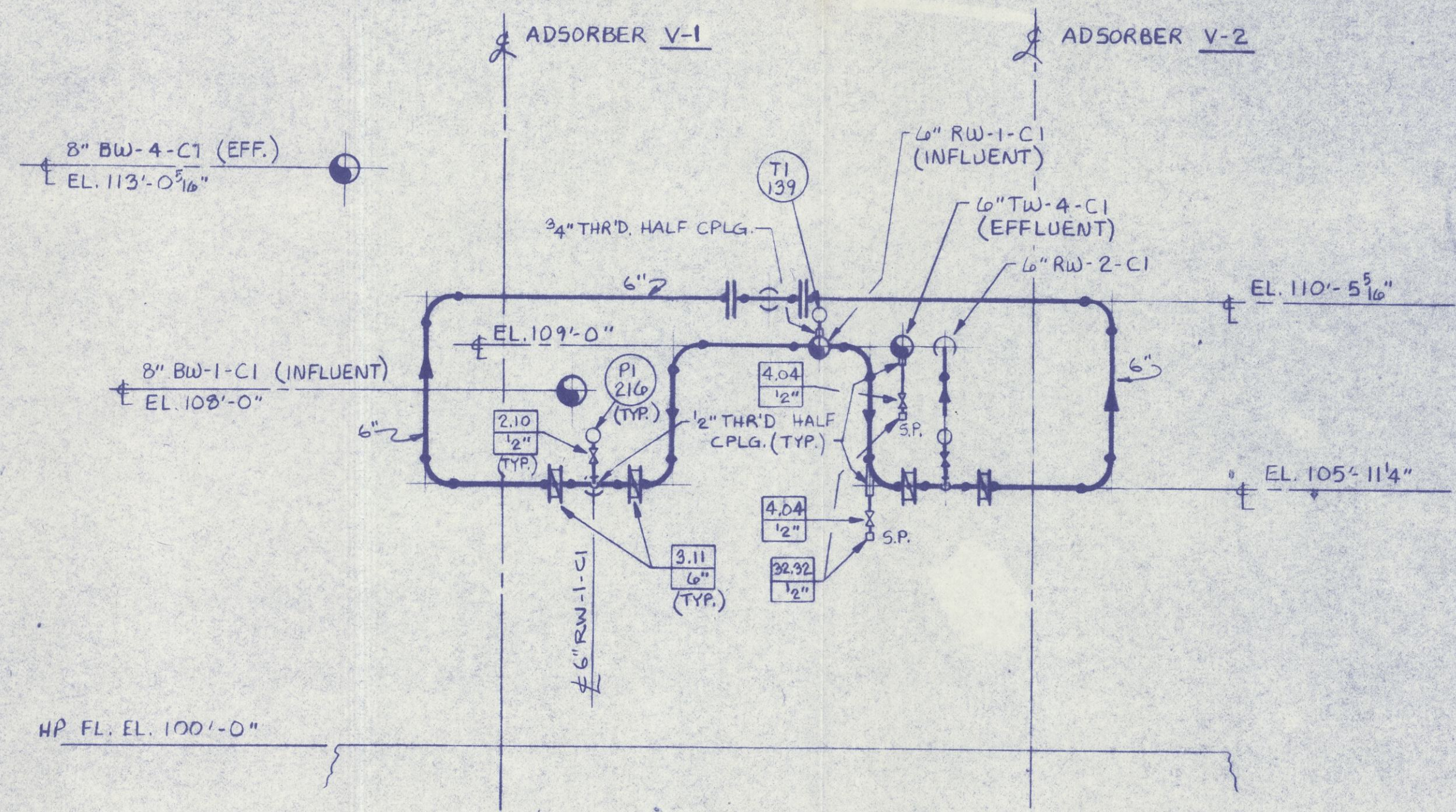
P.O. BOX 1346

PITTSBURGH, PA. 15201

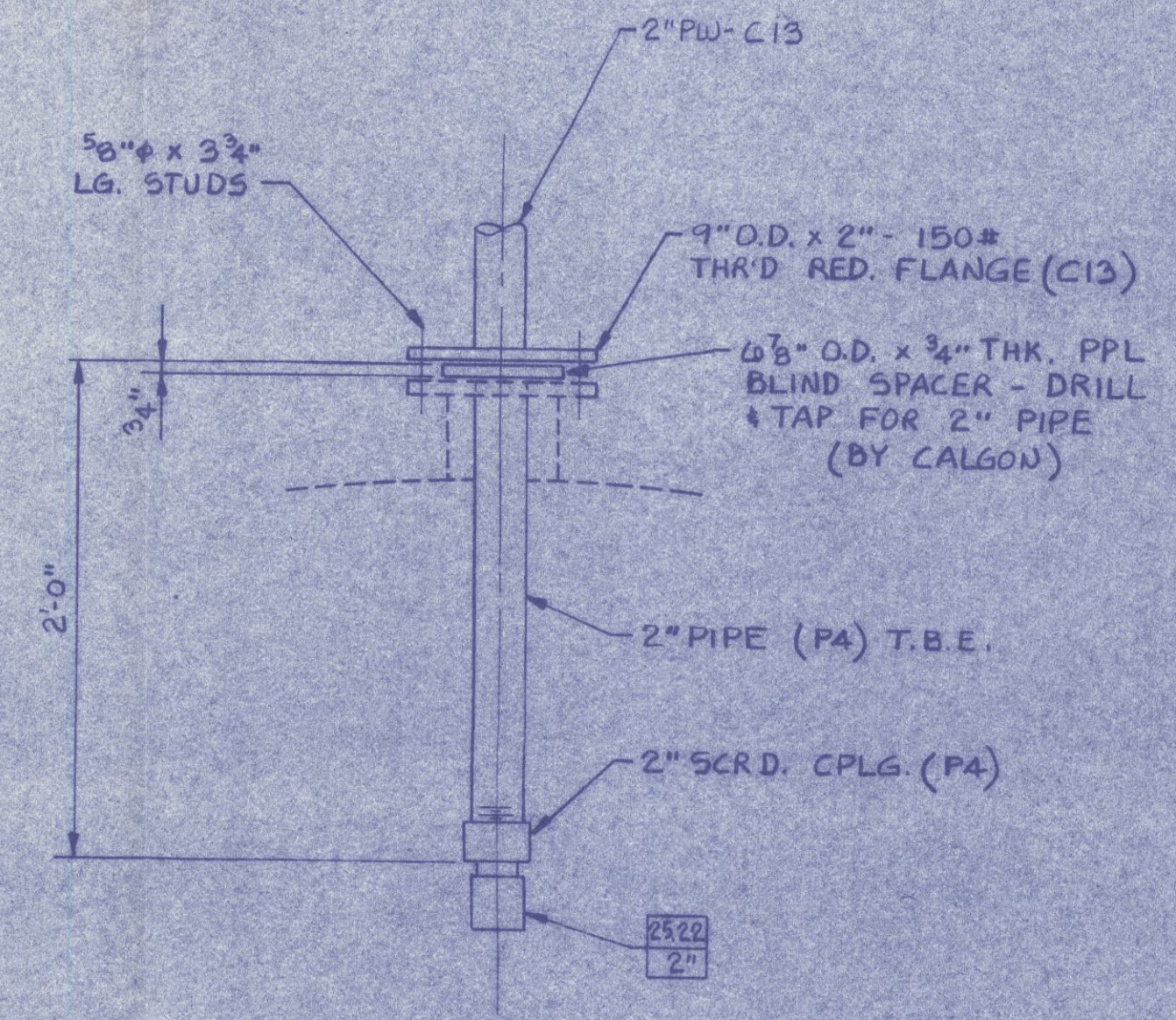
THIS DRAWING AND DESIGN, IS THE PROPERTY OF CALGON CORPORATION AND IS NOT TO BE REPRODUCED IN WHOLE OR PART, NOR EMPLOYED FOR ANY PURPOSE OTHER THAN SPECIFICALLY PERMITTED IN WRITING BY CALGON CORPORATION (A SUBSIDIARY OF MERCK & CO., INC.). THIS DRAWING LOANED SUBJECT TO RETURN ON DEMAND.



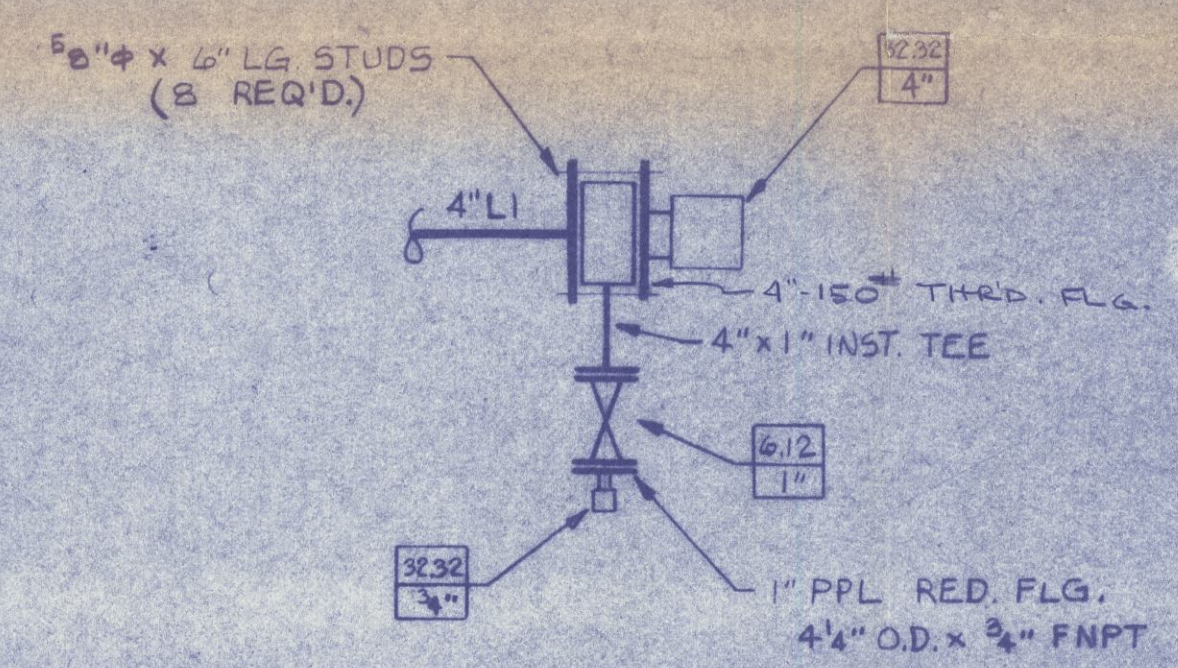
SECTION C
103



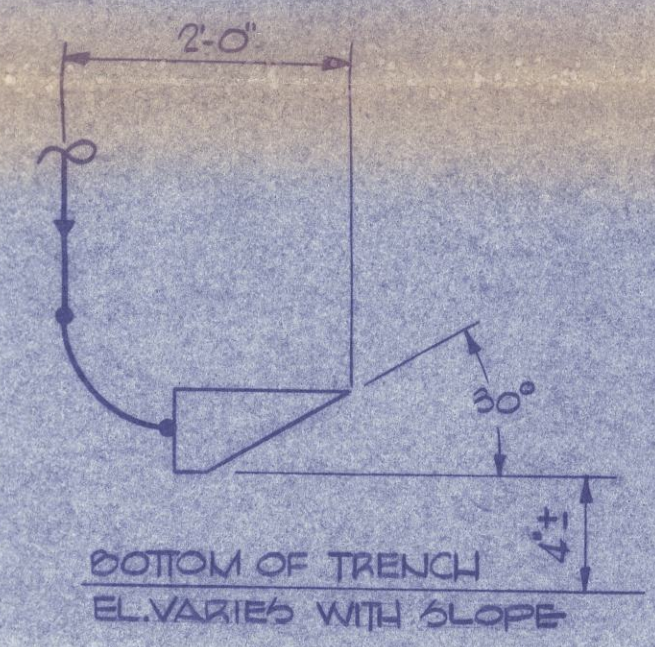
SECTION D
103



DETAIL NO. 1 (2 REQ'D)
SCALE: NONE



DETAIL 2
(2 REQ'D)
103

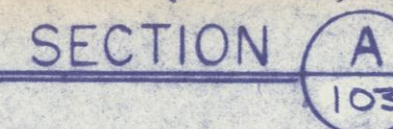


DETAIL 3
(TYP 8 PLACES)
104

ISSUED
JAN 10 1985

SUBMITTED FOR APPROVAL

ACTIVATED CARBON DIVISION CALGON ENVIRONMENTAL SYSTEMS		PLANT REILLY TAC, ST. LOUIS PARK, MINNESOTA	
 SUBSIDIARY OF MERCK & CO., INC. P.O. BOX 1346 PITTSBURGH, PA. 15230		TITLE BACKWASHABLE SERIES DESIGN SYSTEM - PIPING SECTIONS & DETAILS -	
THIS DRAWING AND DESIGN, IS THE PROPERTY OF CALGON CORPORATION AND IS NOT TO BE REPRODUCED IN WHOLE OR PART, NOR EMPLOYED FOR ANY PURPOSE OTHER THAN SPECIFICALLY PERMITTED IN WRITING BY CALGON CORPORATION (A SUBSIDIARY OF MERCK & CO., INC.). THIS DRAWING LOANED SUBJECT TO RETURN ON DEMAND.		DRAWN m3g	CHECKED wab
PROJECT 9209CG		APPROVED SCALE 3" = 1'-0"	REV. A
NO. REVISION BY DATE FILM		DRAWING NO. 9209CG-105	



1.) \odot DESIGNATES CHAIN OPERATOR REQ'D

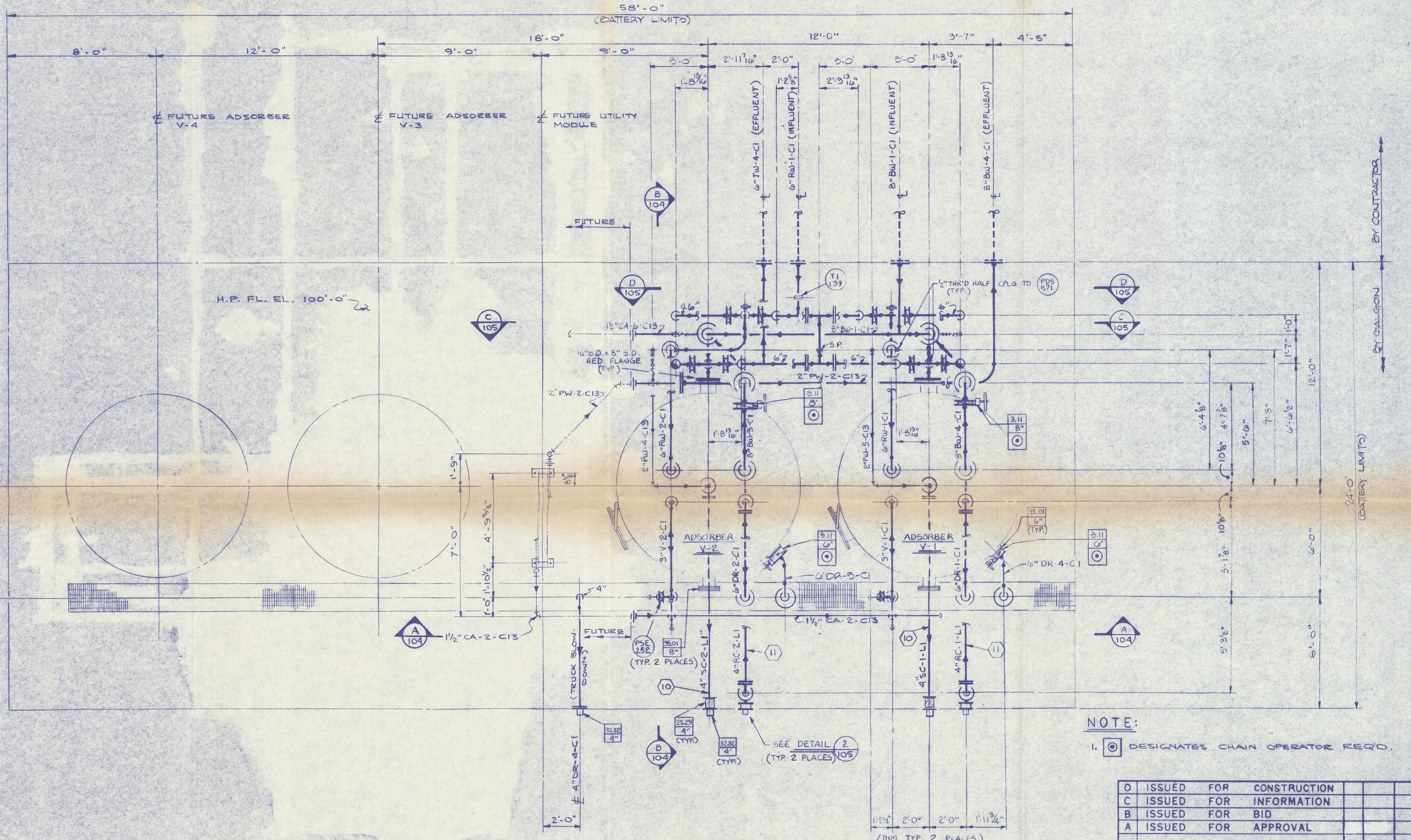


NO	REVISION	BY	DATE	FILM
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PITTSBURGH, PA 15230

SE0500	104	A
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NOTE:
 1. DESIGNATES CHAIN OPERATOR REQ'D.

O	ISSUED FOR CONSTRUCTION			
C	ISSUED FOR INFORMATION			
B	ISSUED FOR BID			
A	ISSUED FOR APPROVAL			
NO.	REVISION	BY	DATE	FILM

ACTIVATED CARBON DIVISION
 CALGON
 ENVIRONMENTAL SYSTEMS

SUBSIDIARY OF MERCK & CO., INC.
 P.O. BOX 1346 PITTSBURGH, PA. 15230

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REILLY TAY, ST. LOUIS PARK, MINNESOTA

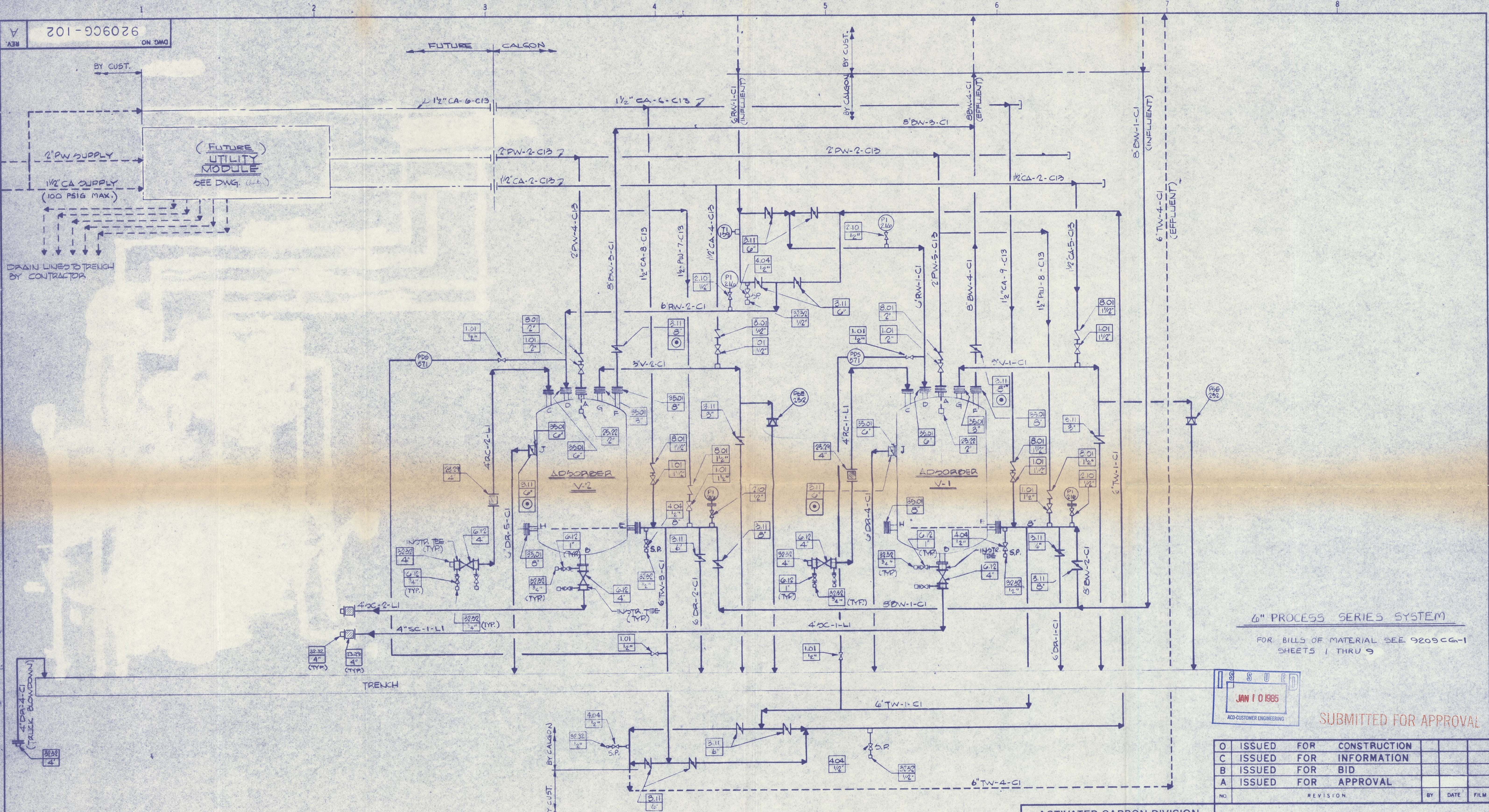
TITLE: **BACKWASHABLE SERIES DESIGN SYSTEM - PIPING PLAN -**

SCALE: 3/8" = 1'-0"

DRAWN: *msa* CHECKED: *war* APPROVED: *[Signature]*

PROJECT: 9209CG DRAWING NO. 9209CG-103 REV. A

PLAN

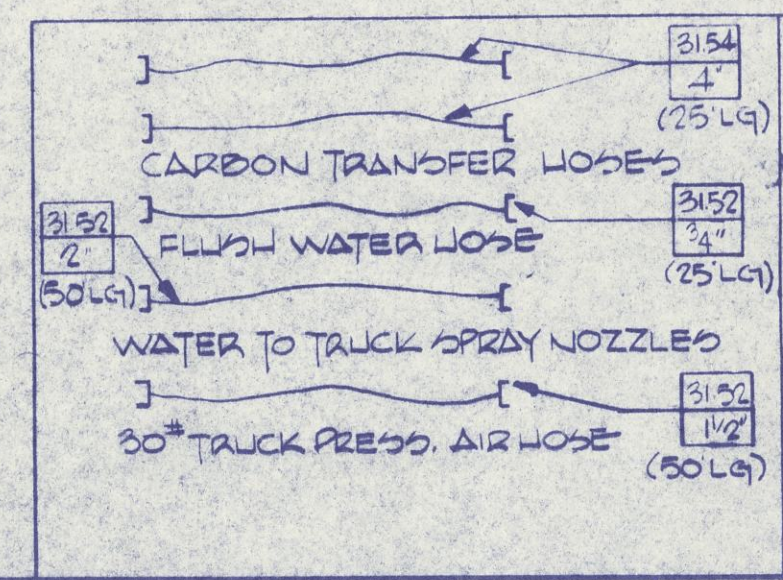


6" PROCESS SERIES SYSTEM
FOR BILLS OF MATERIAL SEE 9209CG-1
SHEETS 1 THRU 9

JAN 10 1985
ACC-CUSTOMER ENGINEERING

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LEGEND
RC — REACTIVATED CARBON
SC — SPENT CARBON
BW — BACKWASH
DW — PLANT WATER
CA — COMPRESSED AIR
SP — SAMPLE POINT
V — VENT
DR — DRAIN
RW — RAW WATER
TW — TREATED WATER
— CHAIN OPERATED
— BY CALGON
— BY CUSTOMER
--- FUTURE

DESIGN CONDITIONS
FLOW RATE
GPM — AVG.
1200 GPM — MAX.
TEMPERATURE
BACK WASH — 1200-1500 GPM
PLANT WATER 100 GPM @ 60 PSIG MIN.
COMP AIR 200 SCFM @ 100 PSIG MAX.

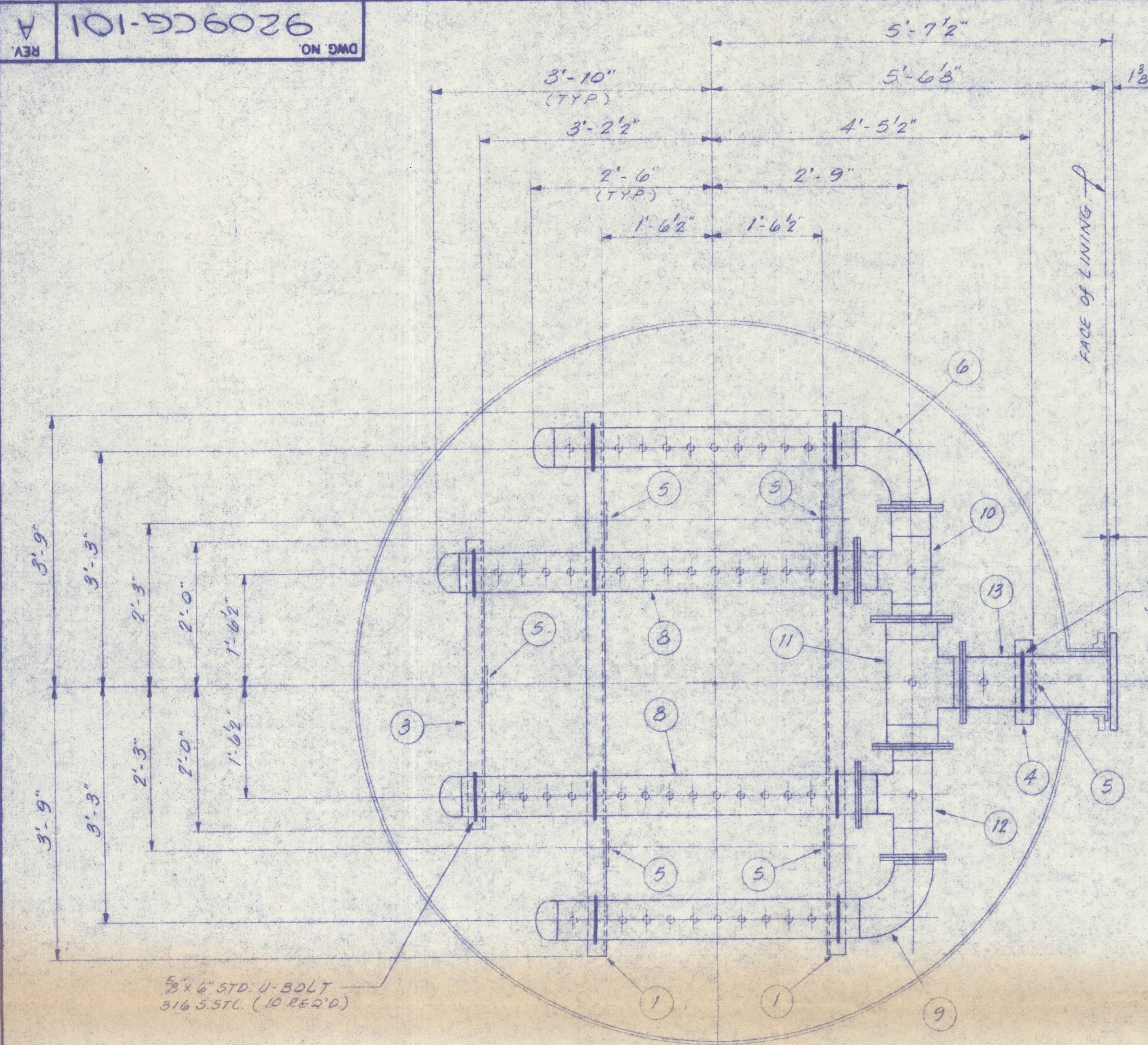
ACTIVATED CARBON DIVISION
CALGON
ENVIRONMENTAL SYSTEMS

CALGON
CORPORATION

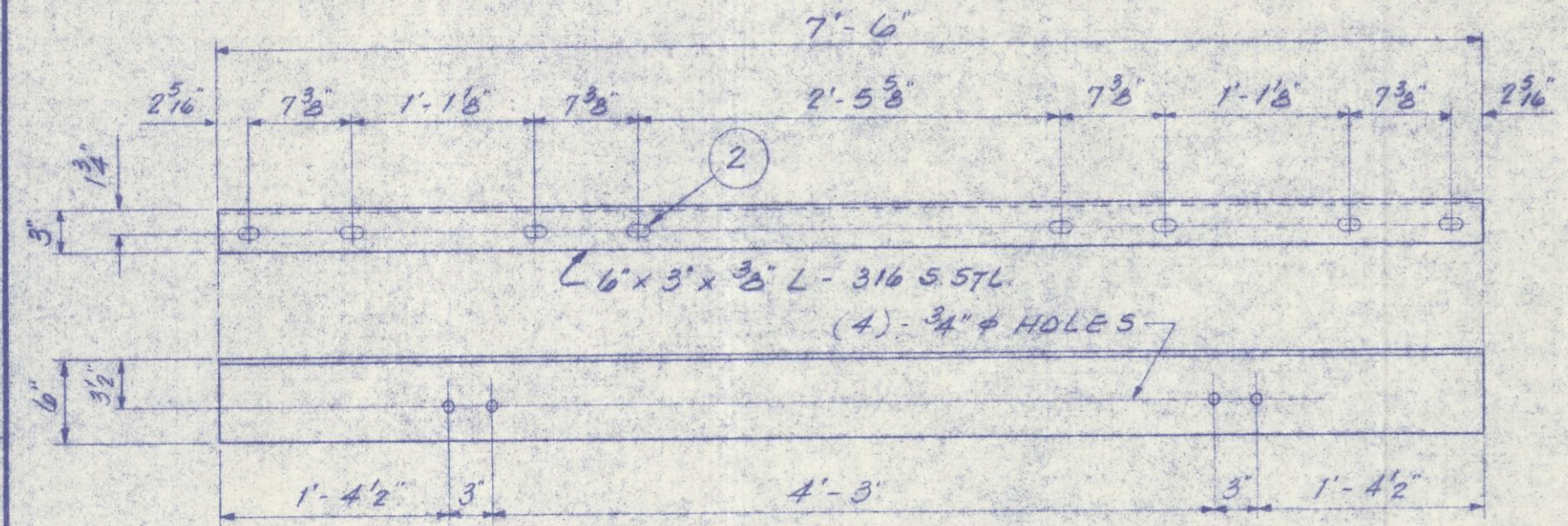
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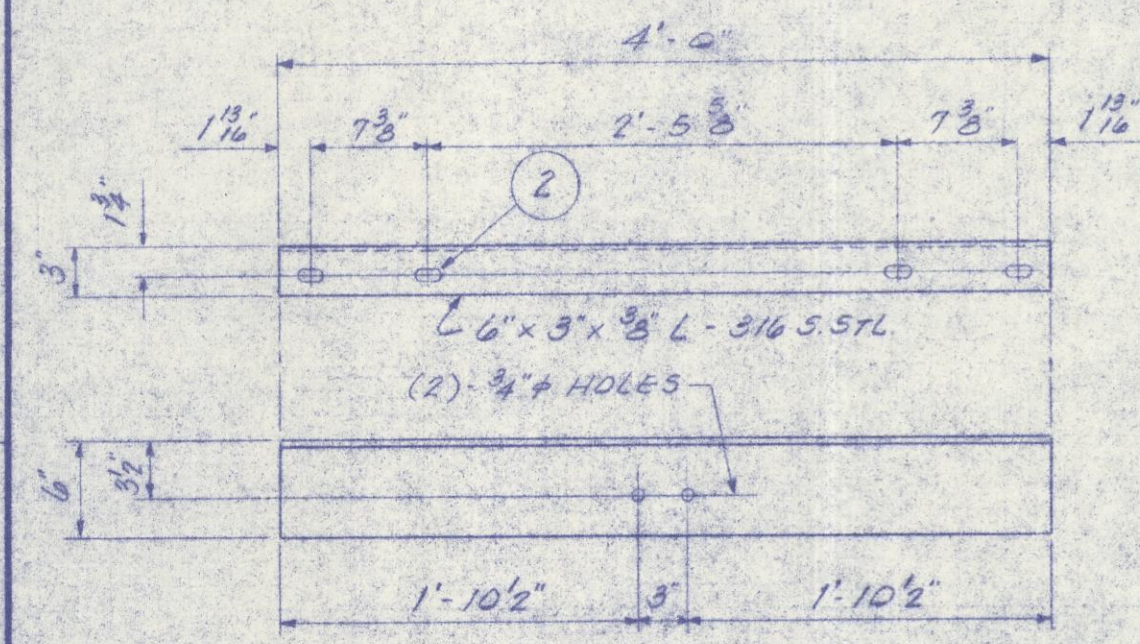
PLANT		REILLY TAR, ST. LOUIS PARK, MINNESOTA	
TITLE		BACKWASHABLE SERIES DESIGN SYSTEM FLOW DIAGRAM	
DRAWN	CHECKED	APPROVED	SCALE
GP	WAB		NONE
PROJECT	DRAWING NO.	REV.	
9209CG	9209CG-102	A	



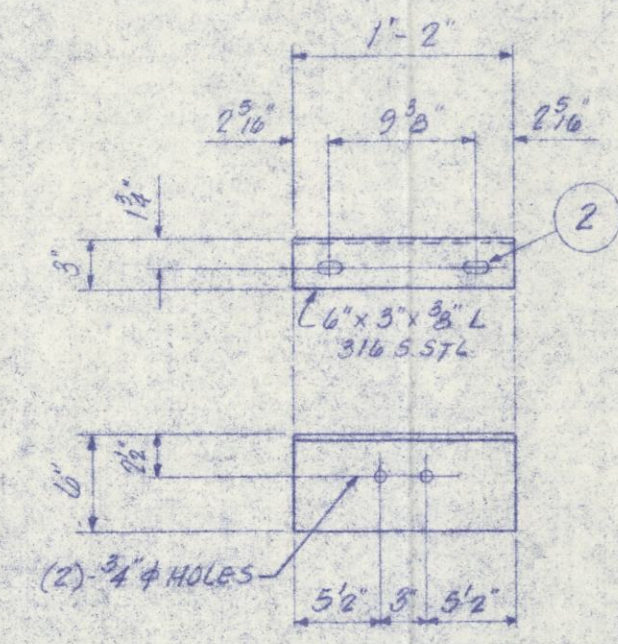
PLAN - UNDERDRAIN ASSEMBLY
3/4" = 1'-0"



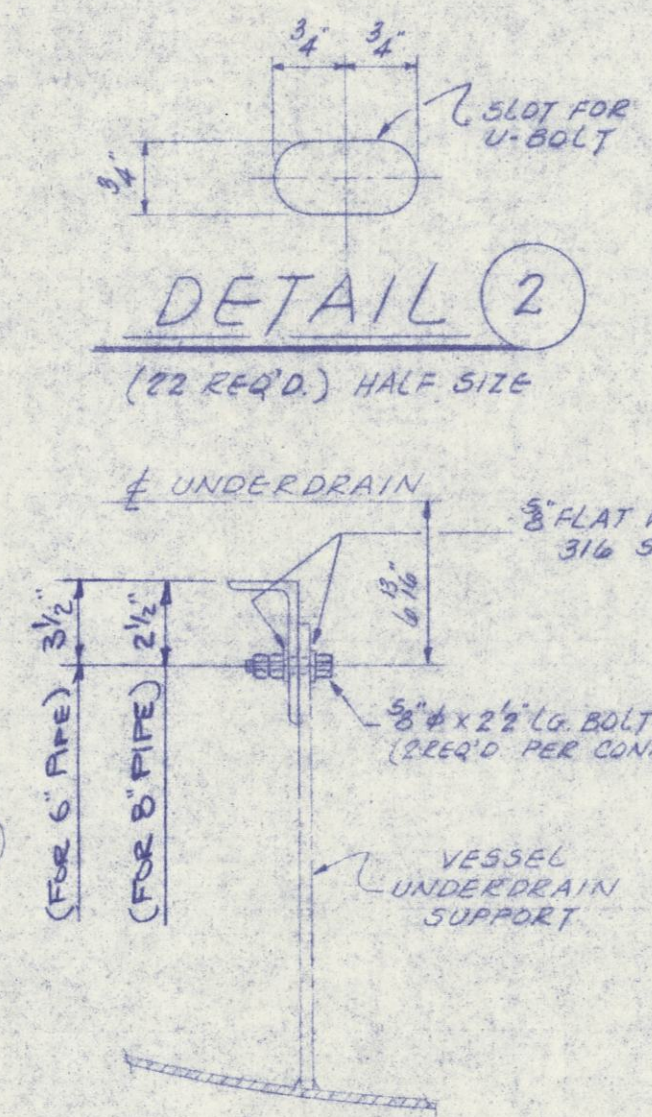
DETAIL (1)
(2 REQ'D) 1" = 1'-0"



DETAIL (3)
(1 REQ'D) 1" = 1'-0"



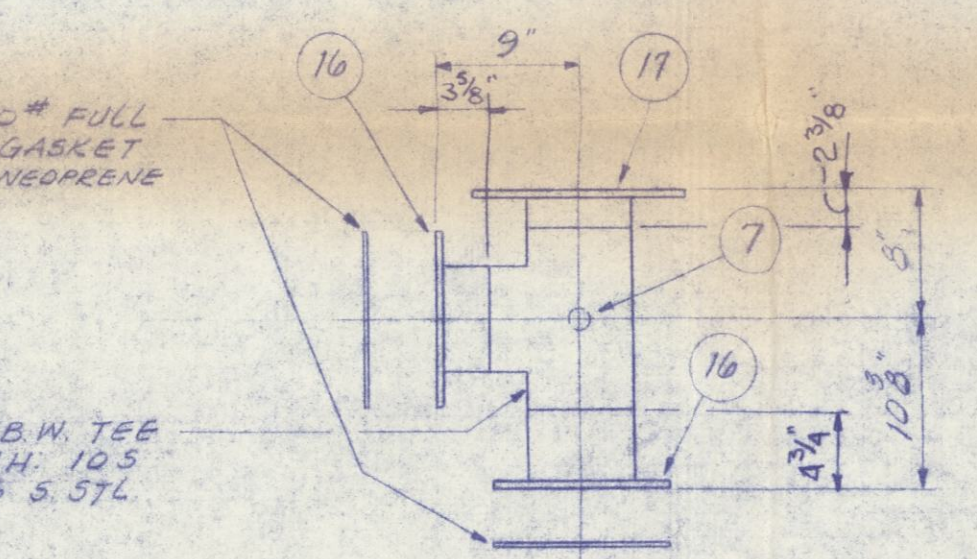
DETAIL 4
(1 REQ'D) T = 1'-0"



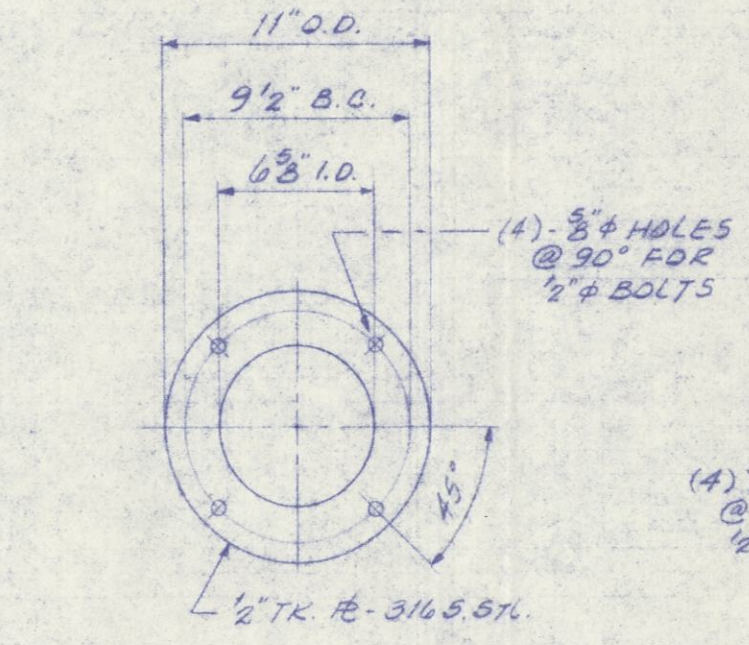
DETAIL (2)
(22 REQ'D.) HALF SIZE



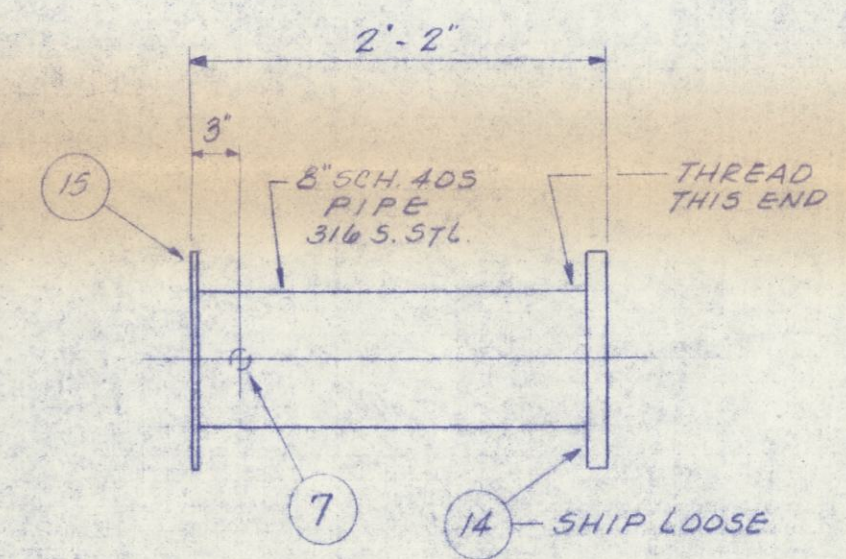
DETAIL (5)
(TYP. 6 PLACES) N.T.S.



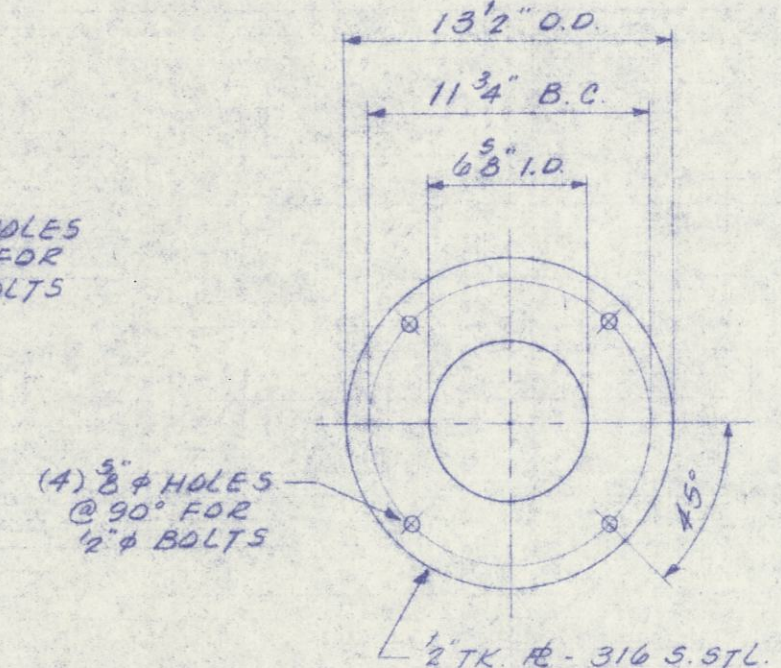
DETAIL (1 REQ'D.) 1" = 1'-0" 12



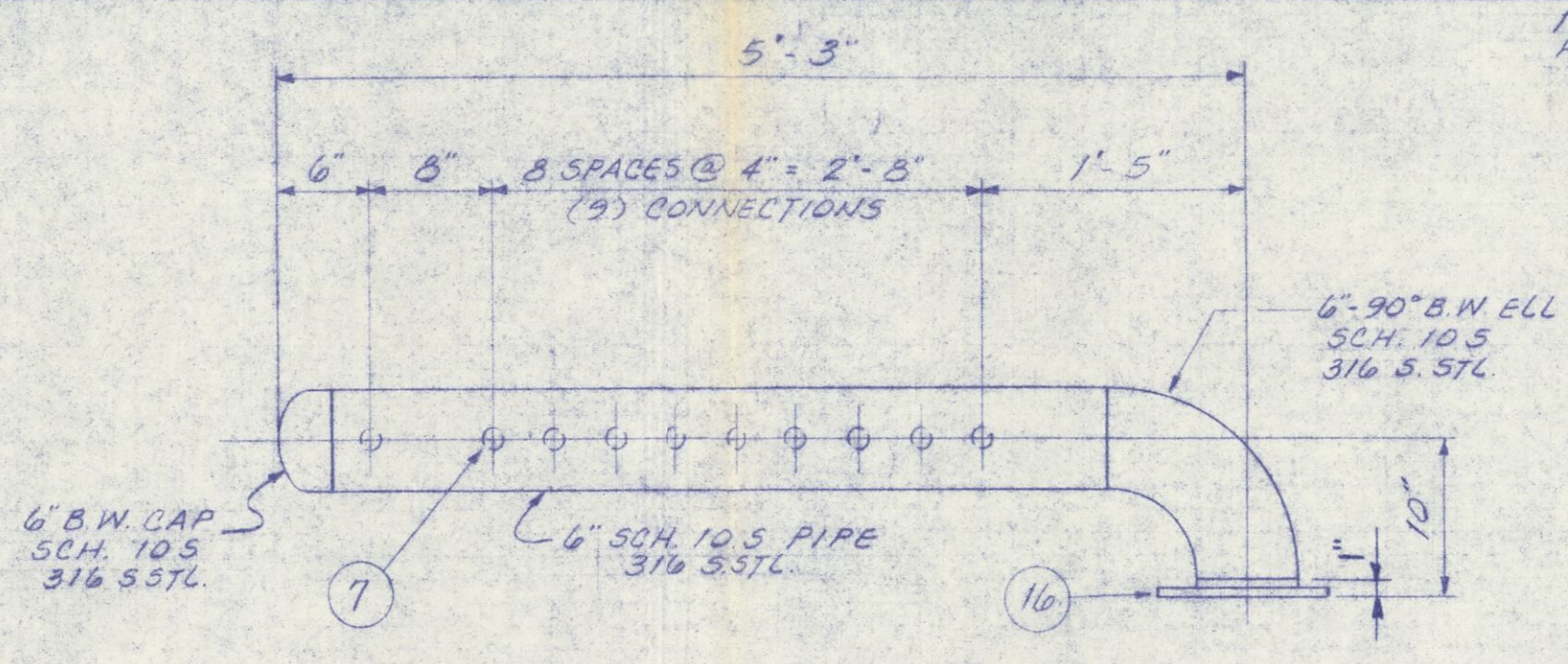
DETAIL (16)
(8 REQ'D.) $1\frac{1}{2}" = 1'-0"$



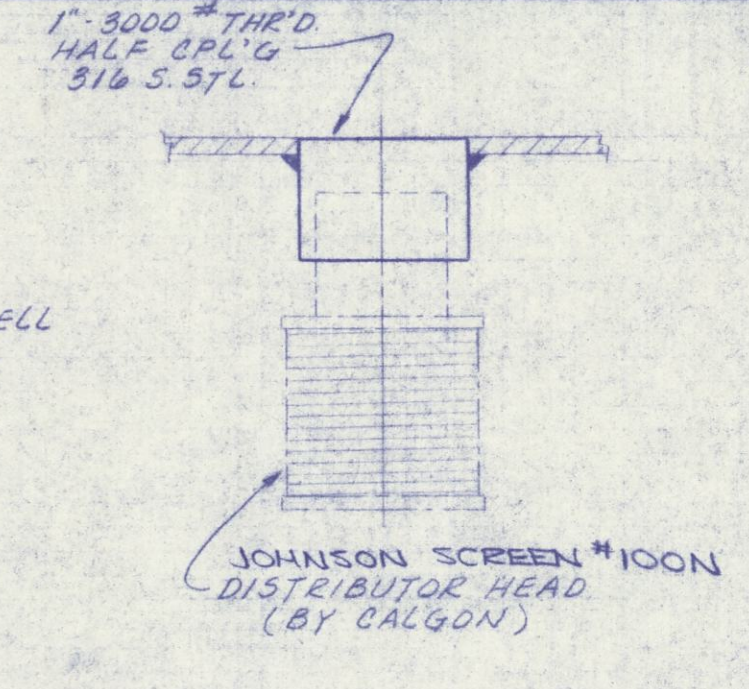
DETAIL (13)
(REQ'D) 1" = 1'-0"



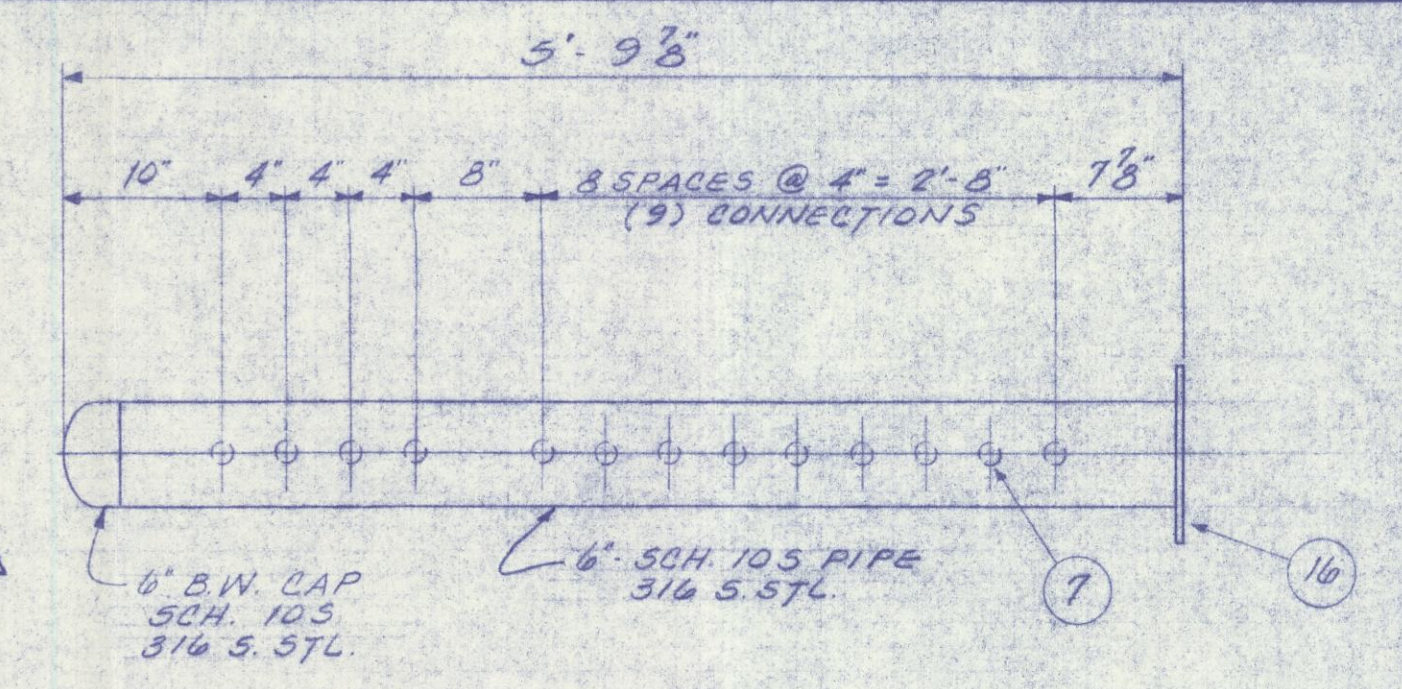
DETAIL (17)
(2 REQ'D.) $1\frac{1}{2}" = 1'-0"$



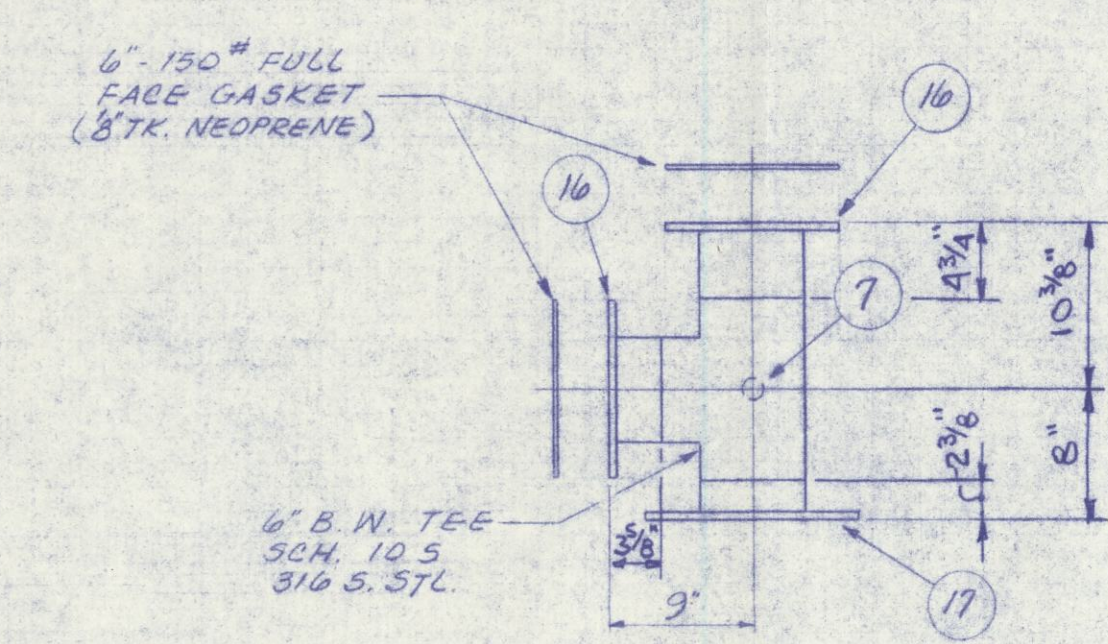
DETAIL (6)
(1 REQ'D.) 1" = 1'-0"



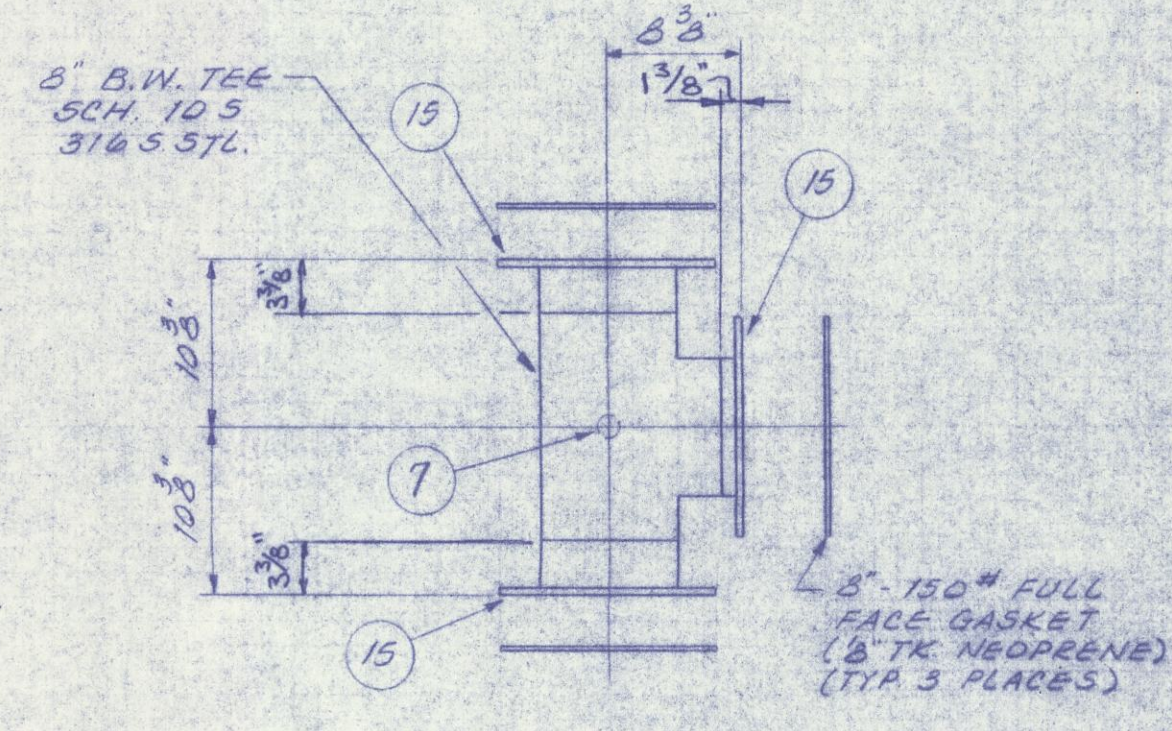
DETAIL (7)
(50 REQ'D.) HALF SIZE



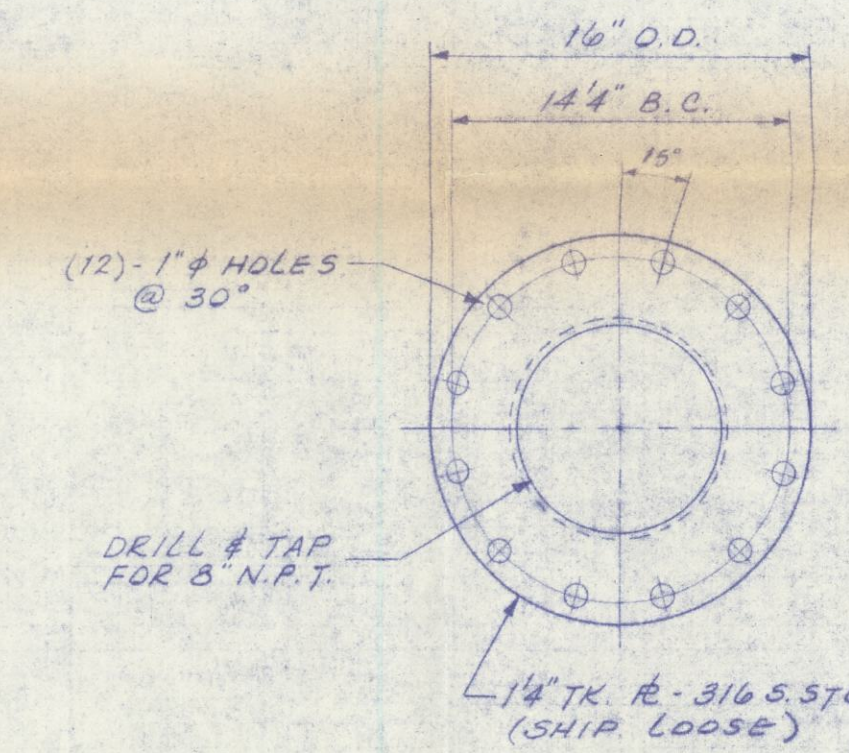
DETAIL (8)
(2 REQ'D.) 1" = 1'-0"



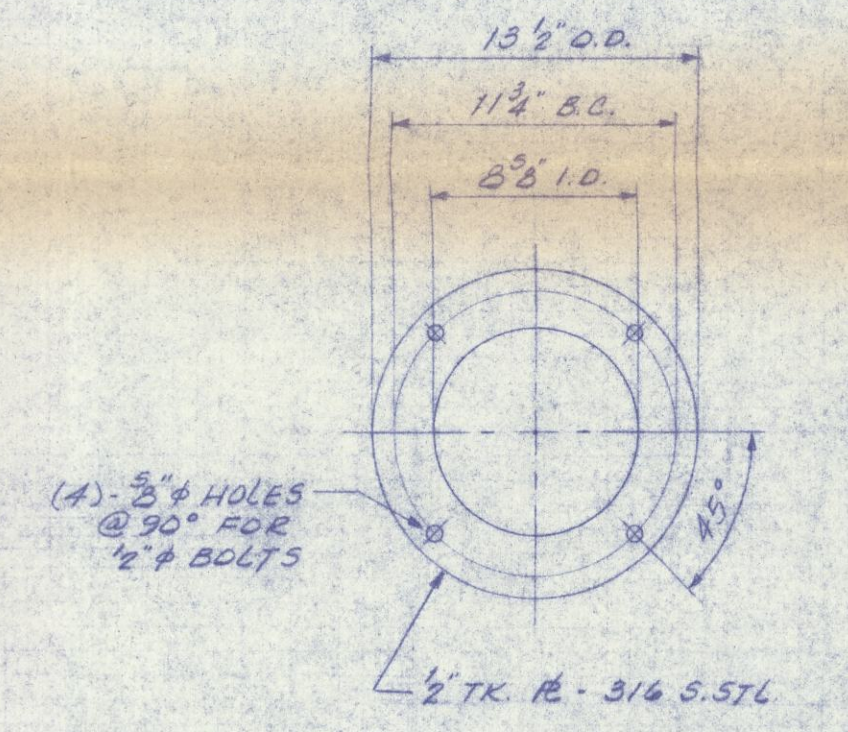
DETAIL (10)
(REQ'D.) 1" = 1'-0"



DETAIL (11)
(1 REQ'D) 1" = 1'-0"



DETAIL (14)
(1 REQ'D.) 1'2" = 1'-0"



DETAIL (15)
(4 REQ'D) $1\frac{1}{2}" = 1'-0"$

NOTE:
FOR BILL OF MAT'L SEE B/M 9209CG-2
SHEETS 1 & 2.

O	ISSUED FOR CONSTRUCTION			
C	ISSUED FOR INFORMATION			
B	ISSUED FOR BID			
A	ISSUED FOR APPROVAL			
NO.	REVISION	BY	DATE	FILM

SUBMITTED FOR APPROVAL

PLANT REILLY TAR, ST. LOUIS PARK, MINNESOTA

TITLE
ADSORBER UNDERDRAIN



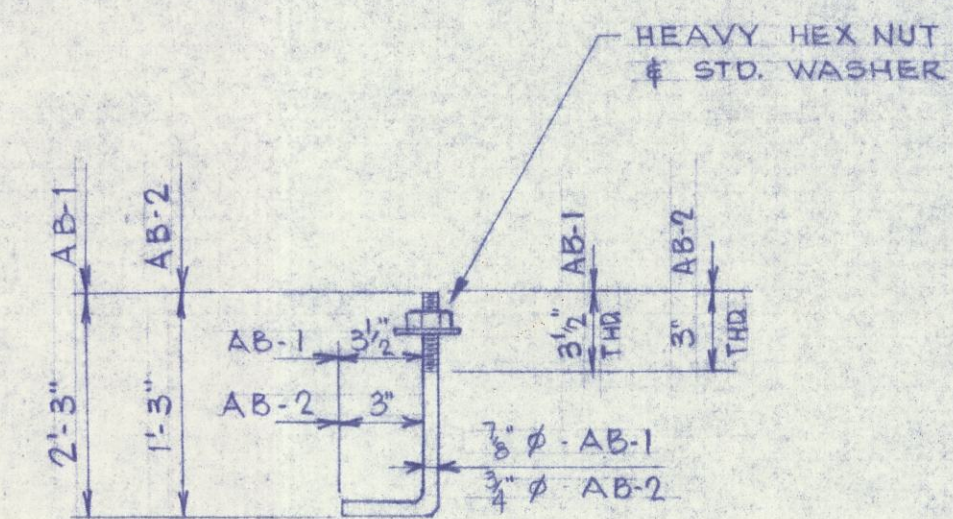
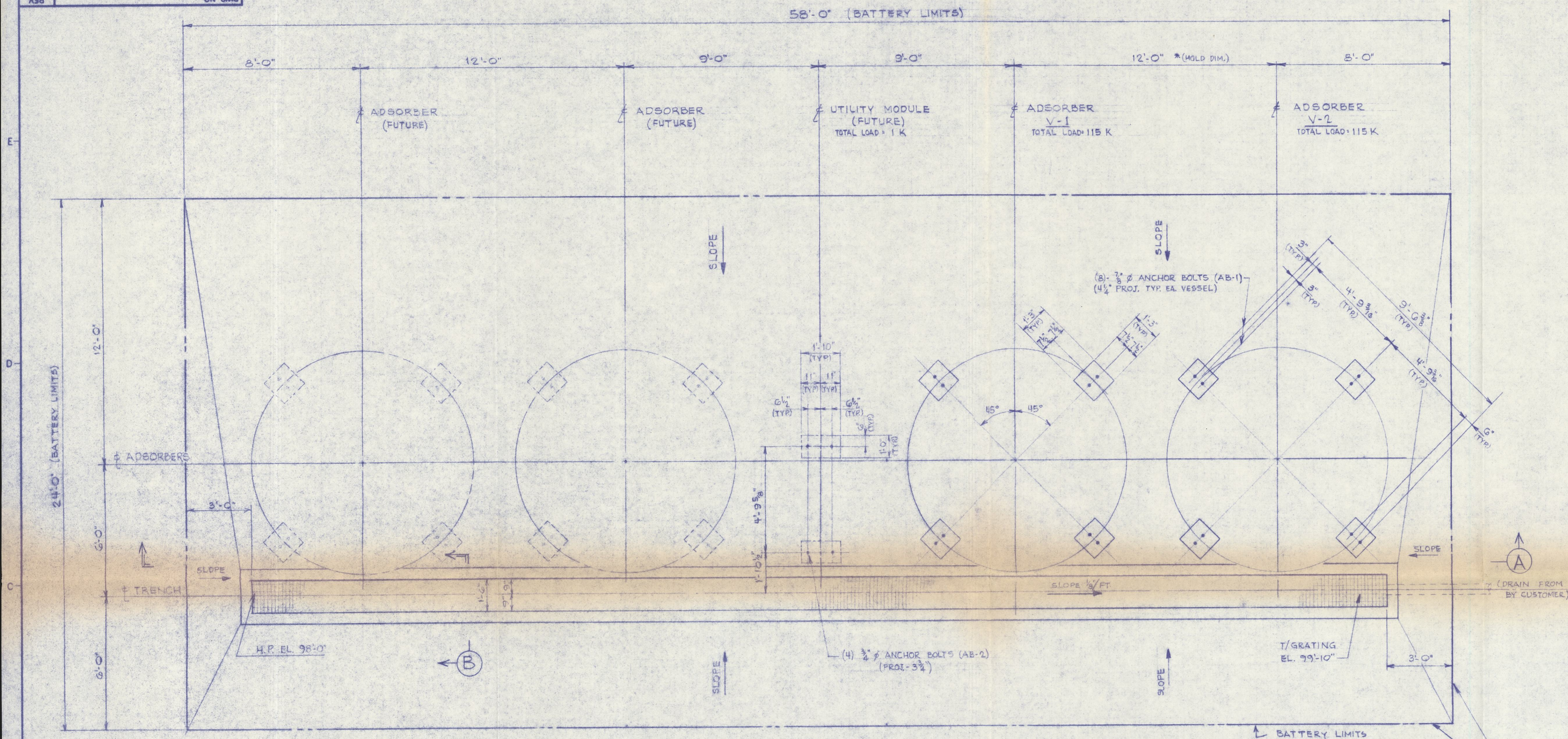
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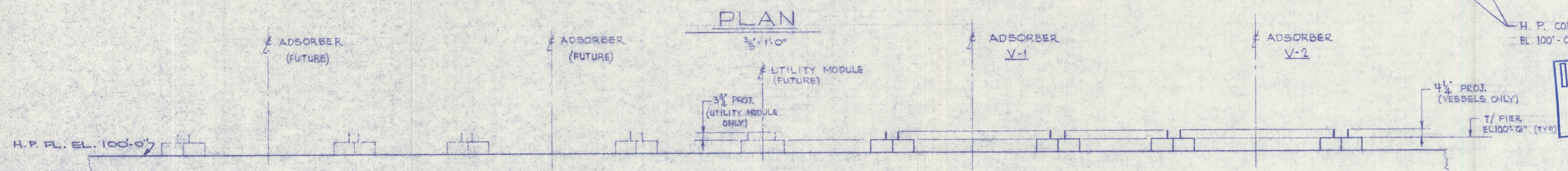
DRAWN <i>RS</i>	CHECKED	APPROVED	SCALE <i>NOTED</i>
PROJECT <i>9209CG</i>	DRAWING NO. <i>9209CG-101</i>	REV. <i>A</i>	



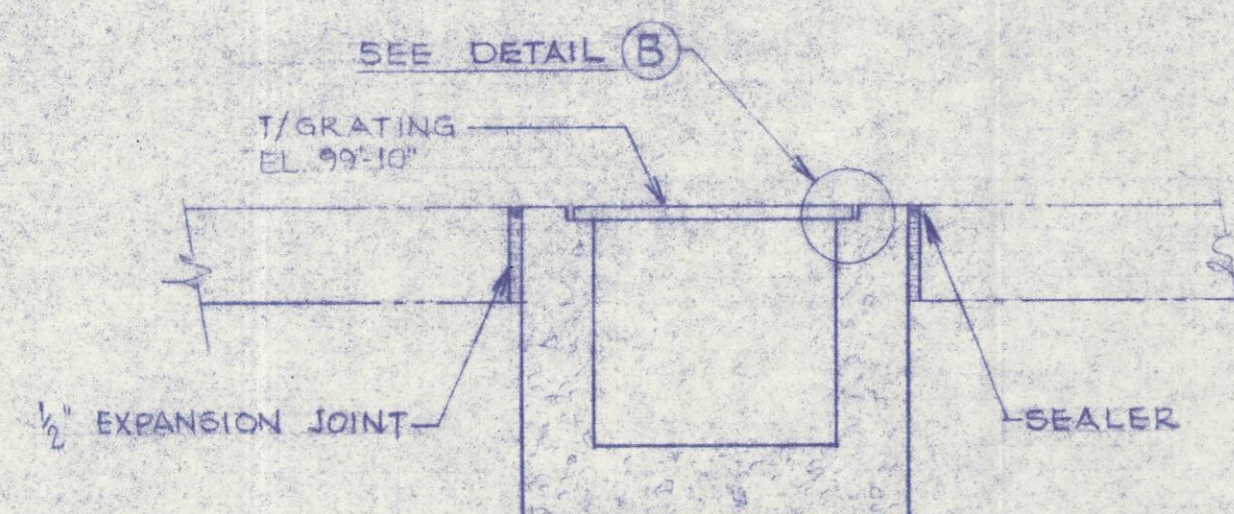
ANCHOR BOLT - N.T.S.

- MK - AB-1 - 16 REQ'D
MK - AB-1 - 16 REQ'D (FUTURE)
MK - AB-2 - 4 REQ'D (FUTURE)

- NOTES:
1. THIS DWG. IS INTENDED FOR ANCHOR BOLT LOCATIONS, LOADS AND BATTERY LIMITS ONLY, AND NOT INTENDED TO BE USED AS A DESIGN FOR FOUNDATIONS, PADS AND TRENCH.
 2. FLOOR TO SLOPE TO TRENCH.
 3. WHEN SETTING EQUIPMENT- ALLOW FOR 1" GROUT.
 4. * - INDICATES THESE DIMENSIONS MUST BE HELD.

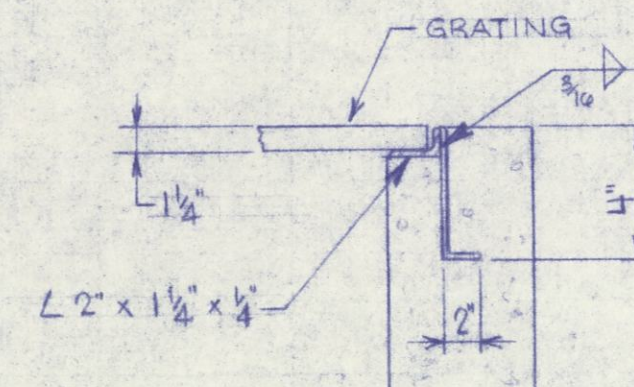


PLAN



SECTION (B)

NTS



DETAIL (B)

NT.S



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C	ISSUED FOR INFORMATION			
B	ISSUED FOR BID			
A	ISSUED FOR APPROVAL			

PLANT	REILLY TAR, ST. LOUIS PARK, MINNESOTA
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TITLE	DATE	BY	NO.	PRICE	REMARKS
...

ANCHOR BOLT LOCATION PLAN AND DETAILS

ON OR BY IS	DRAWN RLB	CHECKED	APPROVED	SCALE AS SHOWN
	PROJECT 9209 CG	DRAWING NO.	9209 CG-100	REV. A

SUBMITTED FOR APPROVAL